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DETERMINATION OF THE OPTIMAL USE LIFE OF U. S. ARMY T-10 TROOP TYPE PERSONNEL PARACHUTES. PART I

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Army Materiel Command

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This paper investigates, through the use of analysis of variance, the possible extension of use life of U.S. Army T-10 Troop type main parachutes. The U.S. Army Natick Laboratories, located in Natick, Massachusetts, furnished data acquired from destructive testing performed on 105 T-10 reserve parachutes and 110 T-10 main parachutes.

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Recommendations are made for a two-year extension of use life beyond the current ten year limitation on T-10 main parachutes. Other recommendations are also made concerning revising military specifications and centralizing of parachute test facilities. The reader is also referred to Part Two of this report which develops a controlled test plan to be employed in future testing of parachutes in an effort to obtain an optimal use life while minimizing the number of parachutes to be tested.

ABSTRACT

This paper investigates, through the use of analysis of variance, the possible extension of use life of U. S. Army T-10 Troop type main parachutes. The U. S. Army Natick Laboratories, located in Natick, Massachusetts, furnished data acquired from destructive testing performed on 105 T-10 reserve parachutes and 110 T-10 main parachutes.

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I wish to acknowledge the assistance I received from Dr. R. L. Street, Dr. G. A. Elliff and Dr. R. S. Morris, the members of my committee.

Special thanks must also be given to Mr. Michael Mahar, Mr. Vasant Devarakonda, and Mr. Richard Wells, who provided data and assistance from the U. S. Army Natick Laboratories, Natick, Massachusetts.

During the course of this work, the author was employed by the United States Army as a career intern in the AMC Maintainability Engineering Graduate Program.

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INTRODUCTION

Description of the Problem

In February of 1973, the U. S. Army Aviation Command Headquarters, located in St. Louis, Missouri, initiated a new testing program concerning the age-life extension of air items, which included main parachutes, reserve parachutes, and parachute harnesses. Recently, the U. S. Army Natick Laboratories, located in Natick, Massachusetts, by the use of a sampling and testing program, extended the useful service life of T-10 reserve parachutes to 12 years from date of manufacture and of T-10 personnel parachute harnesses to 13 years from date of manufacture. Natick Laboratories is now conducting a similar testing program upon T-10 troop-type main parachutes in an effort to justify a comparable age-life extension as was done for the reserves. Natick's plans include designing a program which will call for continual sampling into the future with the presumption of someday justifying even further extensions of service life. In the past, T-10 personnel parachute assemblies have been kept in service for either 10 years or for 100 jumps, whichever occurred first. It has been recommended that the 100 jump limitation be removed as it cannot be supported by engineering data. In the future, it will no

longer be necessary to keep count of the number of accrued jumps per parachute.

Natick Laboratories has subsequently completed destructive testing of 110 T-10 main personnel parachute assemblies and has supplied this data to the author for statistical analysis. In addition, the results of destructive testing completed on 105 T-10 reserve personnel parachute assemblies, which had been tested previously, were also supplied to the author.

Examination of the data concerning the physical properties of the canopy material is the subject of this report. In a supplementary report, listed as Part II, investigation of suspension line and riser data will be undertaken and recommended test procedures and methods are developed for the purpose of future parachute testing.

Description of the T-10 Parachute

The military uses of the parachute are varied and complex, but the one most commonly recognized is its association with the Army paratrooper. Virtually all military jumps are done in mass drops and make use of the static line type of deployment. The Army also has some specially trained groups of paratroopers who are proficient in free fall and skydiving. In the case of static line deployment, the paratrooper's parachute opens immediately

upon his exit from the aircraft. The parachute is designed to get the soldier to the ground as quickly as possible while maintaining a safe rate of descent. To expedite a rapid descent to the ground, military aircraft generally drop the paratroopers at an altitude of 1500 feet. T-10 parachutes are capable of withstanding tremendous forces and a very large safety factor is included in their design. The parachute is subjected to its maximum forces after the jumper has gone through a period of free fall, during which his velocity has increased. In the case of high-speed jet aircraft ejections, free fall is necessary prior to the opening of the parachute. The immediate opening of the parachute at high jet speeds could very easily injure the jumper or destroy the parachute. A free fall allows the jumper to decelerate to a safe opening speed, while allowing him to fall to a lower altitude, thus lowering his chances of injury from cold temperatures, from exposure to lower atmospheric pressure, and from oxygen starvation. An automatic opening device is often used to release the parachute at a preset altitude and is designed to function at a certain prescribed atmospheric pressure.

The static line type or military personnel type parachute requires no action by the soldier except to exit the aircraft. The static line is fastened to the airplane and it pulls the parachute canopy from the pack o

deployment bag, and then breaks away as the parachute deploys. The soldier's weight provides the activating force while the static line and a portion of the pack remain attached to the airplane. For all training or other premeditated jumps in the military, the main parachute is worn on the back and an emergency reserve parachute is worn on the front. Both parachutes are attached to the same single harness.

The U. S. Army T-10 troop-type parachute is the standard rig currently used for military paratroopers. The T-10 consists of seven major components; the static line, the pack, the deployment bag, the canopy, the suspension lines, the risers, and the harness.

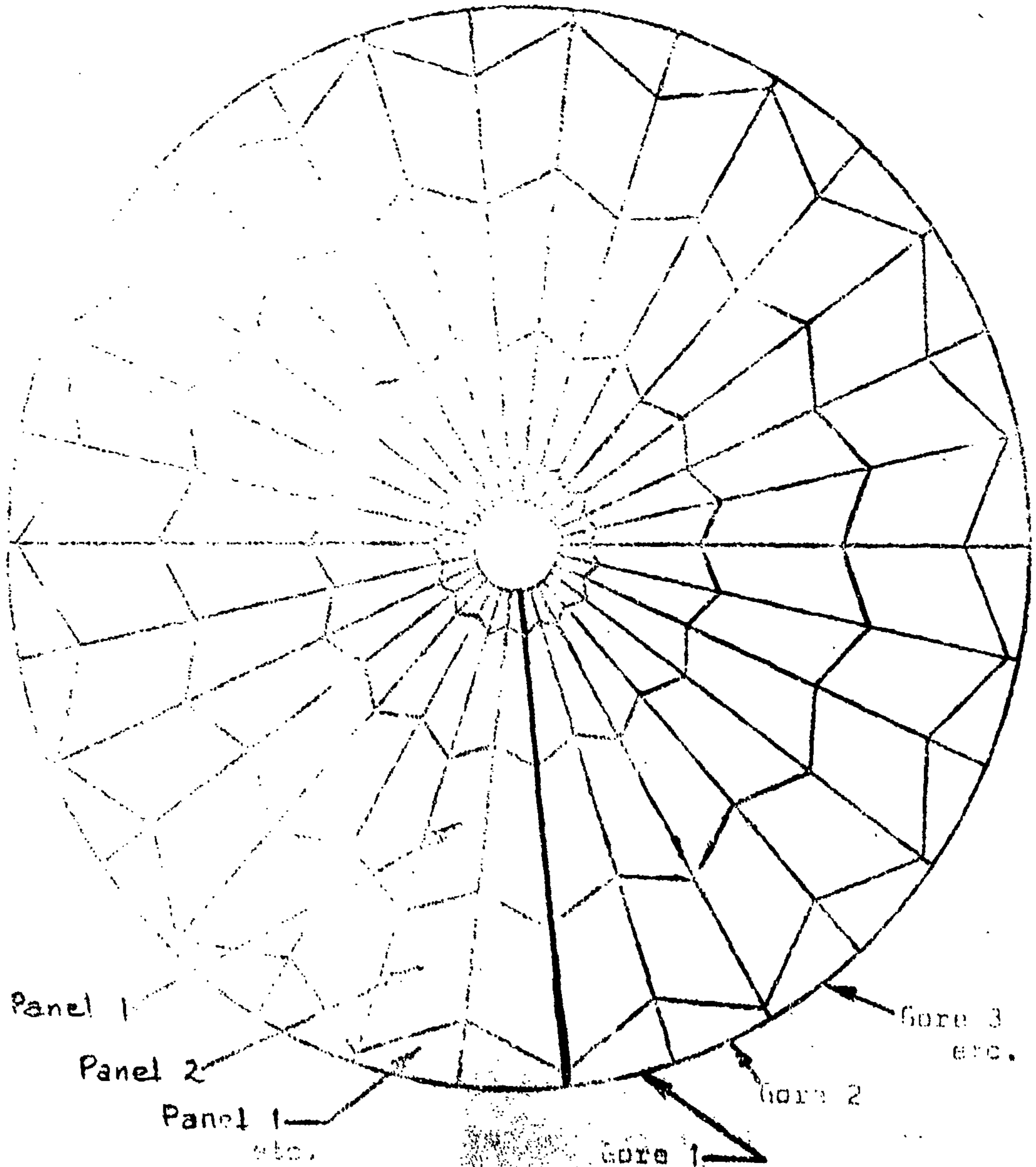
The static line, as previously indicated, is used to automatically open the pack and thus release the parachute. The assembly consists of a heavy length of webbing, which is usually eight feet or more in length and has a tensile break strength of at least 4000 pounds. At one end of the webbing is a heavy snap fastener which snaps onto an aircraft anchor ring cable and at the other end is the steel ripcord cable and pins.

After the paratrooper leaves the aircraft, the force on the anchored static line pulls the ripcord pins from the cones and unlocks the pack. The pack is the only

non-load-bearing part of the total parachute system and it functions to contain the suspension lines, canopy, bag, and harness. It is made of rugged, durable canvas or of heavy nylon and is supported by an internal metal frame with several spring stiffeners. Military packs vary in size and shape and may have two or more locking cones depending on the design.

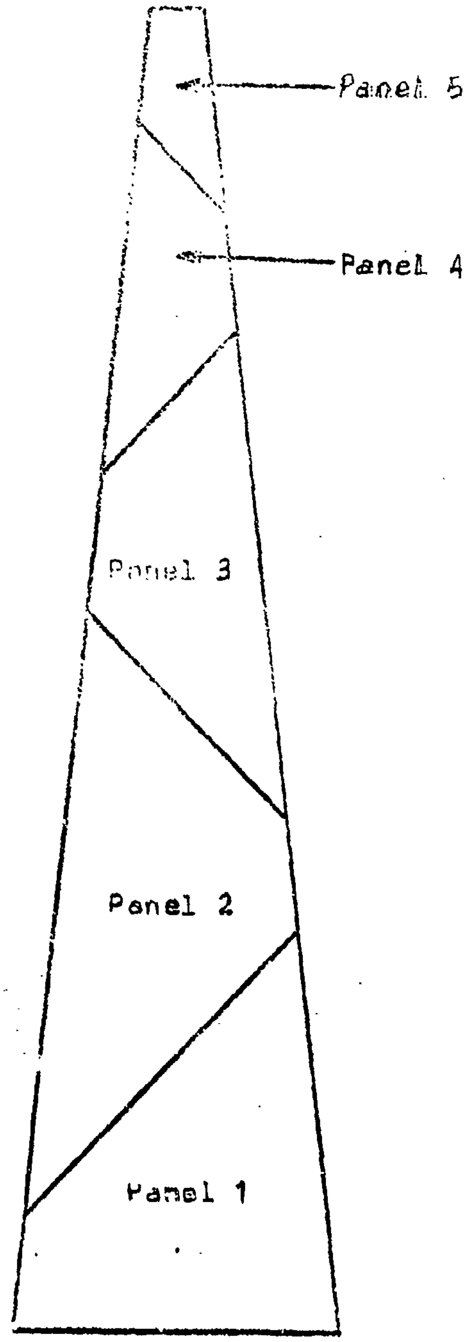
The deployment bag is best described as a safety device to insure that the jumper does not become entangled with the canopy during the opening of the parachute. It also serves to discourage canopy and suspension line entanglements by allowing the lines to deploy prior to releasing the canopy for inflation. It has the shape of a pillow case and the canopy is simply S-folded and methodically stuffed into the bag.

The T-10 canopy is a 35 foot nominal diameter, 10 percent flat, extended skirt type. It narrows to a 34 foot diameter at the bottom edge, or skirt, and is best described as a nylon cloth polygon of 30 sides constructed in a parabolic shape. It consists of 30 gores (similar to a pie sliced into 30 equally sized pieces) with each gore consisting of five panels. (See Figures A and B.) The canopy consists of over 1300 square feet of nylon cloth connected by about 3700 yards of nylon thread in well over



TOP-VIEW OF 35 FOOT DIAMETER T-10 PARACHUTE CANOPY

FIGURE A



TYPICAL PARACHUTE GORE CONSTRUCTION

FIGURE 8

750,000 stitches (25). The five panels of each gore are identified by the numbers 1, 2, 3, 4, and 5, starting at the skirt edge and proceeding up the canopy to the apex. Similarly, the gores are numbered from 1 to 30. Diagonal seams are cut and sewn at a 45 degree angle to the centerline of the gore. This is known as bias construction and is used to provide maximum strength and elasticity. The skirt and apex vent hems are reinforced with one inch nylon webbing to insure that a tear does not completely separate the canopy.

The suspension lines on the T-10 parachute run continuously from a connector link near the harness up through the canopy to the apex, and then down the opposite side of the canopy to another lower connector link. Since the lines are continuous, only 15 separate lines are used to form the suspension line network, although it appears that 30 lines are used when viewing the parachute from the skirt of the canopy to the connector links. The radial or main seams of the canopy enclose the suspension lines, but they are only sewn to the canopy at the skirt and apex vent seams. The suspension line itself is made up of several nylon cords covered by a loosely woven nylon sleeve. The greatest strength comes from the inner cords.

At the ends of the suspension lines are short strips

of nylon webbing which connect to the harness. These are known as the risers. Attached to the risers are the guide loops and knobs of the steering controls while the free ends of the risers contain the male fittings of the canopy releases. The canopy release is designed to quickly release the canopy and risers from the harness whenever necessary.

The harness forms a sling about the jumper; it primarily consists of the main lift web on which the jumper sits, two leg straps, one chest strap, crossed backstraps, and sometimes a lateral backstrap. All of the metal fitting on a parachute are known collectively as hardware. They are made of cadmium-plated steel and have minimum load requirements set at about 5000 pounds tensile break strength (25).

Virtually all military pilot and plane crew parachutes now have automatic opening devices (since there is no reserve worn for emergency jumps) in the main packs, while the military paratrooper may have a similar device located in his reserve chute pack. These devices operate barometrically and in the case of the airman, the device also has a timer that operates in case of an ejection at a lower altitude than the one set on the opener. In the past, when the paratrooper had a parachute malfunction, the normal procedure was to manually deploy his reserve

parachute. On many occasions, the reserve chute would become entangled in the main chute during the deployment. The U. S. Army has recently developed an automatic opening device which deploys the reserve chute by the use of a gas-fired projectile. The reserve parachute is fired to a full extension perpendicularly out from the body of the jumper, which allows it to inflate without the risk of its entangling with the main. This has nearly eliminated the chances of a double malfunction caused by the two chutes becoming entangled, which is one of the major causes of death in both sport and military jumping.

Malfunctions are not a common occurrence in parachuting, although an alarming number of people believe that a parachute jump is like flipping a coin, in that you have a 50-50 chance of survival. In reality, a malfunction is an oddity which is seldom, if ever, witnessed by the average paratrooper. In the military drops of thousands and thousands of troops each year, the number of fatal jumps can be counted on one hand. During the year 1973, for example, there was only one fatality from a military static line deployed jump. Moreover, fatalities inevitably occur from operator error or from poor packing procedures. In the last seven years, there were over 2,040,000 Army paratrooper jumps, and during that period, there has been no

recorded failures of canopy material, suspension lines, or risers due to strength deficiencies. In fact, an extensive examination of Army, Navy and Air Force jump records has failed to produce a single instance of injury, at any time period, attributable to such failures.

CHAPTER II

PARACHUTE DESIGN CONSIDERATIONS

To determine the types of strength tests that should be performed on a parachute, it is necessary to understand some of the forces that the parachute must withstand during the opening sequence. All parachutes are designed and constructed with the old idea that a chain is no stronger than its weakest link. Each component of the parachute and its attendant connecting links, from the saddle of the harness to the apex of the canopy, must be capable of carrying its share of the peak stress load which occurs during the opening. During the deployment of the canopy, there are actually two distinct forces: snatch force and opening shock force.

The snatch force is the shock produced on the paratrooper when the parachute assembly is fully strung out and is suddenly being accelerated, or towed, to the same speed as the paratrooper. It occurs just prior to the opening shock force. The suspension line tension reaches a peak stress value prior to canopy inflation and then drops momentarily. The snatch force is dependent upon both the difference between the velocity of the paratrooper and the velocity of the canopy assembly when the suspension lines are fully extended, and the drag area of the entire assembly

at full suspension line extension. The U. S. Army uses bag deployed canopies as the snatch force is considerably reduced due to the canopy being less developed, or opened, at the time of full suspension line extension. Actually, the canopy does not emerge from the bag until full extension has been achieved. The semi-elastic property of the suspension lines is instrumental in absorbing a substantial amount of the jolt caused from the snatch force. Switlik Parachute Company tested a canopy with highly elastic lines over 25 years ago and, although the snatch force was considerably reduced, the lines proved to be impractical due to cold weather causing them to become brittle. Experimentation has also been done un non-stretch lines and has shown that the snatch force to the jumper and to the parachute are increased tremendously. Snatch force is also reduced by decreasing the suspension line length, and by using light-weight nylon (since when less weight must be accelerated, less force is generated).

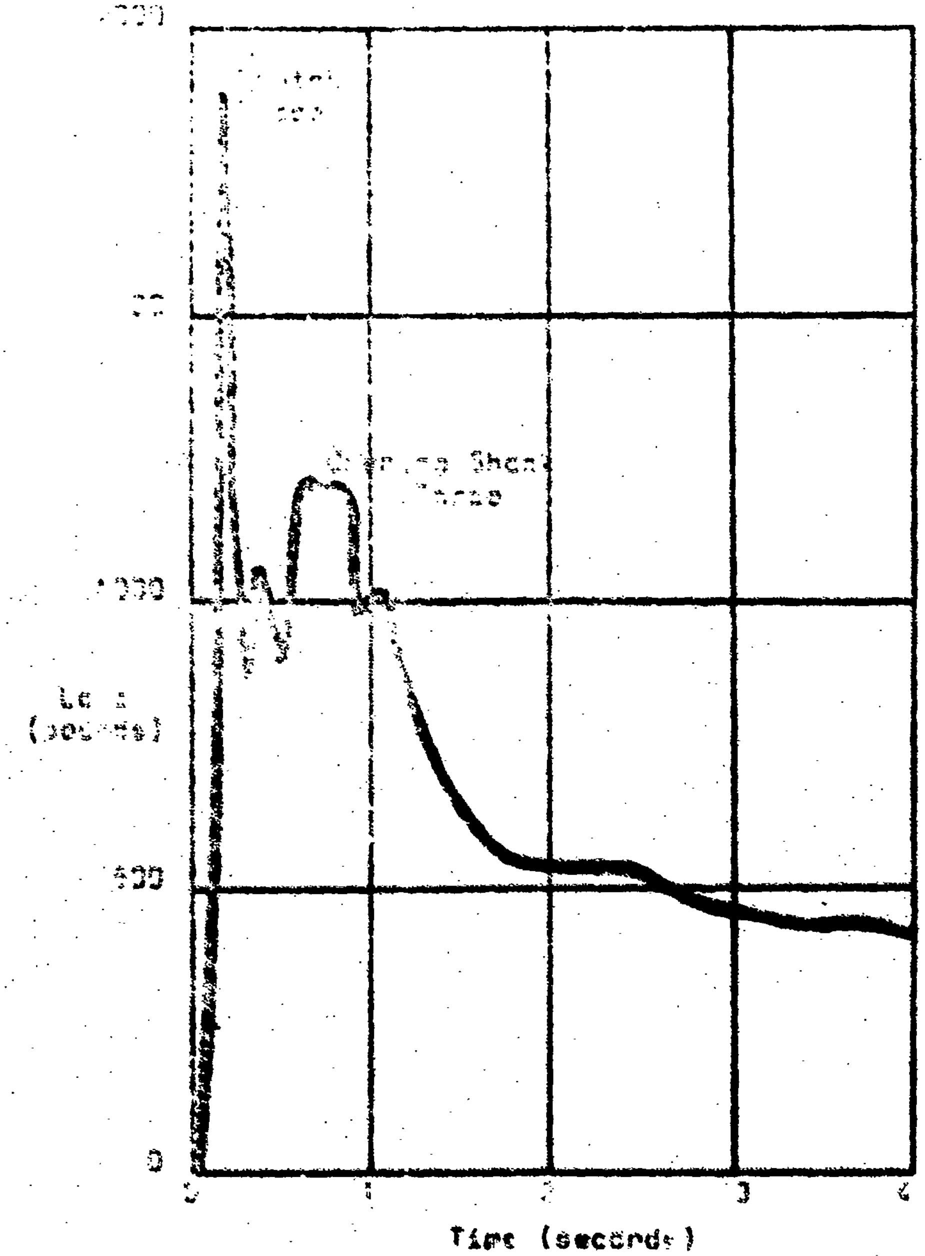
The second distinct force is the opening shock, which is the decelerating force exerted on the paratrooper following the snatch force. It is caused by the acceleration of the open canopy and its entrapped volume of air. It is directly proportional to the canopy's filling rate which in turn is dependent upon the porosity and size of

the canopy. The greater the porosity and the larger the size of the canopy, the longer it will take to fill with air. Each canopy shape has its own opening characteristics regardless of the weight of the paratrooper or his velocity. To reduce the opening shock force, several methods may be employed. Theoretically, an increase in filling time distributes the drag force over a greater period of time and of distance, and thus effectively reduces the opening shock force. One method of achieving this effect is to increase the porosity of the canopy, i.e., by increasing the rate of air flow through the fabric of the canopy, through the apex, or through similar manufactured slots. The permeability of the fabric is then an important design consideration in canopy construction. Another method which may be employed, along with the method just mentioned, is to increase the size of the canopy, which in turn increases the filling time. The inward curved skirt of the parabolic T-10 canopy allows less air to enter and thus provides a further decrease in filling time.

There is very little available data as to the numerical values of the forces experienced upon a parachute canopy and its components during the opening cycle. However, some testing has been done on straight-deployed (no bag pack), 28 foot flat circular parachutes and on bag-deployed

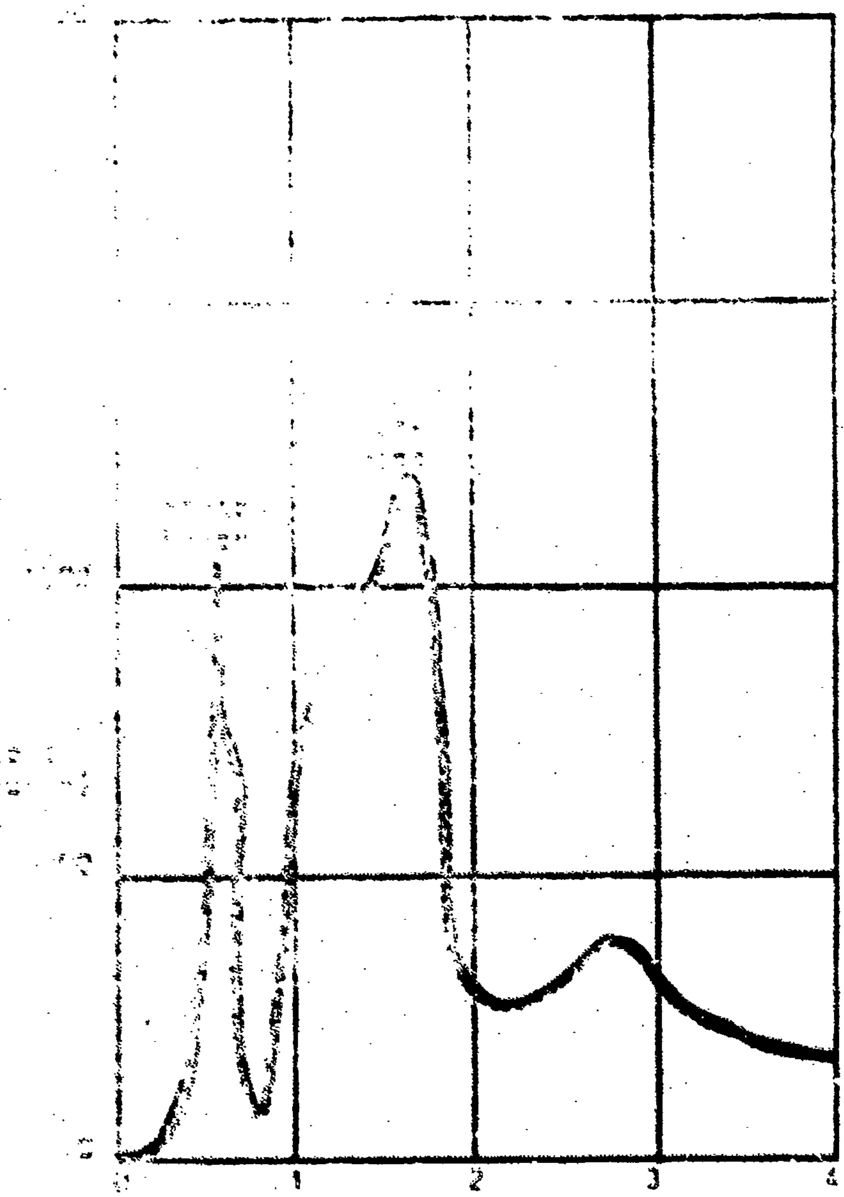
28 foot flat circular parachutes. Measurements were made at the risers, using a 200 pound weight, of the forces experienced at a terminal velocity opening. Keeping in mind that the T-10 is a bag-deployed 35 foot flat circular parachute, an indication of the attendant forces may be ascertained from the graphs in Figure C and Figure D (25). Figure C shows the forces experienced by the straight deployed parachute which shows that the snatch force and the opening shock force occur almost simultaneously, and that the snatch force is the greater, reaching a peak of around 1800 pounds. The usefulness of bag deployment can be seen on inspection of Figure D. The jumper, at his maximum free fall velocity, experiences a maximum force of around 1200 pounds as the bag device slows down the opening of the parachute, and spaces the snatch force and the opening shock force further apart. Since the paratrooper has slowed slightly during deployment, there is less differential air speed to contend with. Also, since the two forces follow each other rather than take effect at the same time, the strain on both the paratrooper and the parachute is reduced.

The snatch force and the opening shock force are, in reality, much less on the paratrooper exiting a military aircraft and equipped with a T-10 parachute. The T-10's immediate inflation and the paratrooper's low velocity at



STRAIGHT DEPLOYED 28-FOOT FLAT CIRCULAR PARACHUTE

FIGURE C



BAG DEPLOYED 18-FOOT FLAT CIRCULAR PARACHUTE

FIGURE 9

the time of exit from the aircraft both serve to keep the differential air speed very low. In addition, the 35 foot diameter and the parabolic construction of the canopy work to effectively reduce both snatch force and opening shock force significantly below those of the 28 foot canopy shown in Figure C and D.

The U. S. Army Test and Evaluation Command has also accumulated some data concerning the types of forces experienced by the parachute during airdrop at high altitude drop zones. Instrumented tests of opening forces on a T-10 main parachute at 11,000 feet altitude recorded a maximum opening force of 2340 pounds. A similar test on 24 foot diameter T-10 reserves at 11,000 feet altitude recorded a maximum force of 4162.9 pounds (21). This data is part of service tests performed on personnel and cargo chutes under severe test conditions and is not representative of the forces experienced during an average deployment.

This chapter on parachute design considerations is supplied so that the reader will better understand the forces involved in parachute functions. Further analysis of the implications of these forces and strength degradation due to age life will be reserved for Part II of this report.

CHAPTER III

TEST PROCEDURES EMPLOYED

Procedures Used at Natick Laboratories

There are numerous tests, both destructive and nondestructive, which are available for the purpose of testing parachute canopies and assemblies. It is questionable whether any one test is better than another and, for this reason, the general procedure is to use a combination of several tests. For the original tests, which were performed on the population of reserve parachutes, Natick Laboratories chose to use break strength, tear strength, and air permeability experiments. Air permeability tests were discarded by Natick during the second testing program, which was performed upon the main parachutes, as they appeared to have little, if any, correlation to actual component and material strength. As a result, only break strength and tear strength tests were performed on the main parachutes, and these tests provided six independent data sets for the canopy material. In an effort to devise a conventional method to understand fabric structure, the canopy material is compared to square-ruled paper. The square ruling forms a matrix which involves both the arrangement and marking of the individual squares, and the network of the intersecting lines which are at right angles

to each other. In the matrix, a vertical row of squares is referred to as the warp yarn (running parallel to the panel seams) and is designated as an end. A horizontal row of squares is referred to as the filling yarn (crosswise to the warp) and is designated as a pick (23).

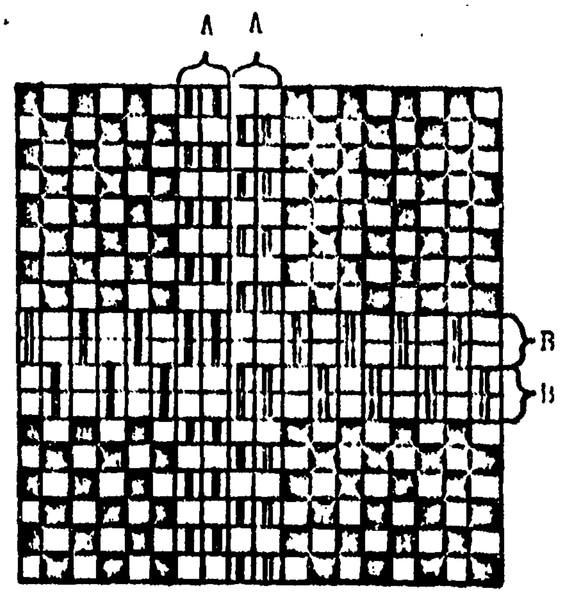
The break strength tests were performed in both the warp and filling directions for each sample, and also, the percentage elongation prior to break, in both warp and filling directions, was recorded at the same time. The tear strength tests were also performed in both warp and filling directions.

The canopy material tested for both the reserves and the mains was Type I (weight 1.1 ounce/square yard) rip-stop weave nylon as described in military specification MIL-C-7020. The weave pattern for Type I canopy material has reinforcement ribs in both the warp and the filling, which form a pattern of squares as shown in Figure E (31). There must be a minimum of 6.5 repeats of this uniform pattern per inch and it serves the purpose of preventing rips and tears from easily spreading throughout the canopy. A partial listing of required physical properties of Type I nylon are shown in Table 1 (31).

In accordance with military specification requirements, Natick Laboratories tested five specimens in each of the warp and filling directions for each sample value given,

FIGURE E

RIP-STOP CANOPY MATERIAL WEAVE PATTERN



A = TWO WARP ENDS WOVEN AS ONE
B = TWO FILLING PICKS PER SHED

TABLE 1

Physical Properties of Type I Rip-stop Weave Nylon

Property	Requirement
Weight, ounces per square yard, maximum	1.1
Thickness, inches, maximum	.003
Breaking strength, ravel strength, pounds per inch, minimum	
Warp	42.00
Filling	42.00
Elongation, per cent, minimum	
Warp	20
Filling	20
Tearing strength, tongue, pounds, minimum	
Warp	5.00
Filling	5.00
Air permeability, cubic feet per minute of air per square foot of cloth	100±20
Yarns per inch, minimum	
Warp	120
Filling	120
Twist, turns per inch, minimum	
Warp	5
Filling	***

i.e., each sample value given is the average of five individual tests.

In the breaking strength and elongation (ravel strip) test, a specimen was prepared by cutting a rectangular shape of canopy material one and one-half inches in width by a minimum of six to nine inches in length. The specimen was then raveled down to exactly one inch in width by removing equal amounts of yarn from each side of the strip as shown in Figure F (31). An Instron tensile test machine, which contained a load and elongation recording mechanism, was then used to break the strip of material. The machine was adjusted to run at a uniform rate of speed of approximately 12 inches per minute. After the specimen was placed in the jaws of the Instron tester, a slight tension was applied to the material to remove the looseness and wrinkles. The breaking strength and the percentage elongation of the sample was then calculated from the average of the results obtained by breaking five specimens.

The tear strength (tongue) test involves preparing a specimen of parachute canopy material, which is three inches in width by a minimum of eight inches in length, with the short direction parallel to the direction being tested. A three inch cut or tongue is then made perpendicular to the short side and the specimen is then ready to be placed in a tensile testing device. Natick made use of

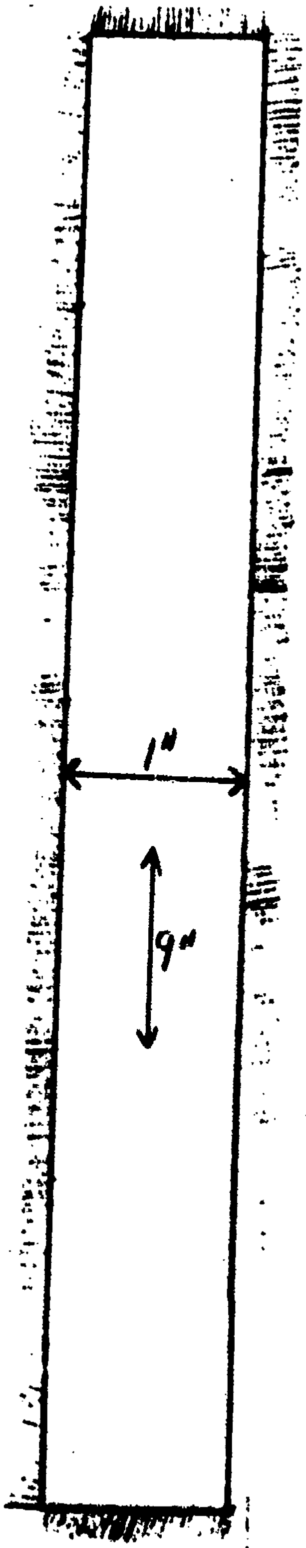


FIGURE F

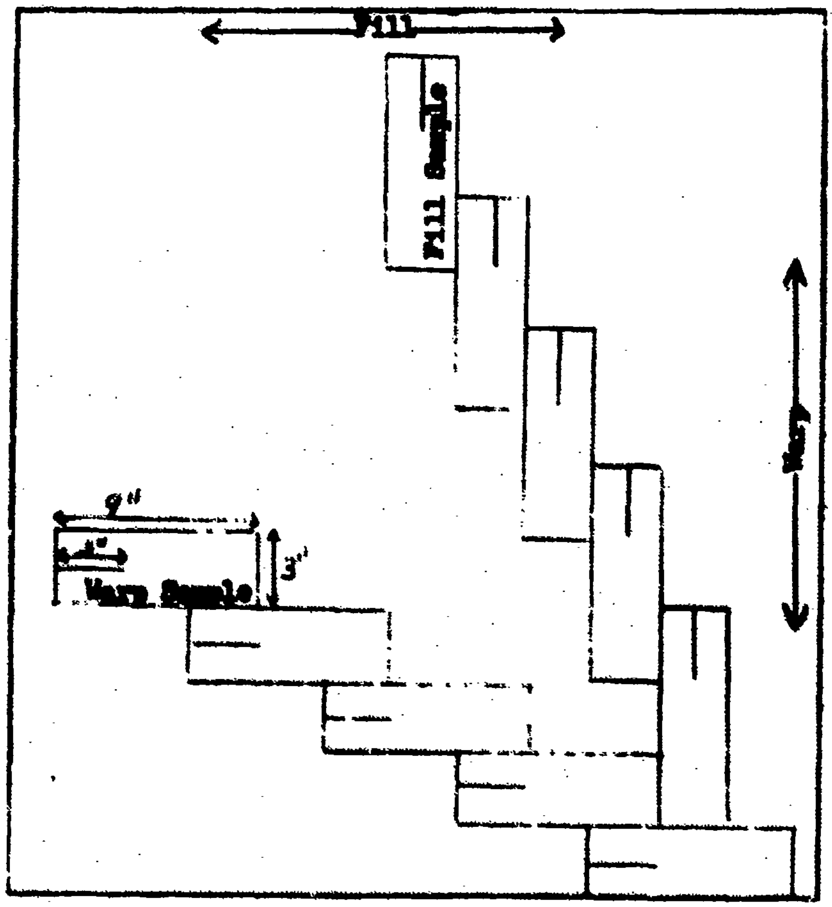
BREAK STRENGTH SPECIMEN

the same Instron tester for the tear strength tests by placing one tongue or strip of the specimen in each jaw and then tearing the specimen for a distance of three to four inches. Tearing strength was then recorded as the average of the five highest peaks of resistence registered during the tear. Figure G (31) indicates how samples for a tongue tear test may be cut from a parachute panel. This is precisely the same procedure that is used to cut samples for the break strength tests and, as explained previously, the tearing of these ten specimens will provide two sample values to be recorded, one in the warp direction and one in the filling direction.

Natick Laboratories has, in the past, conducted many test programs upon parachutes and has published numerous reports concerning the results of these programs. Very little useful information was taken from the previous publications from Natick, as well as from other sources, due to incomplete data listings, different types of parachutes tested, different types of tests used, and the fear of the introduction of additional effects in the analysis of variance experiments performed in this report. Use of other data would have been compromised by having been collected by different operators, by having been recorded by the use of different machines, and so forth.

FIGURE G

LAYOUT DESIGN FOR CUTTING SAMPLES



Procedures Used by Other Facilities

An extensive amount of information concerning the testing and analysis of parachutes over the years by various organizations, both military and civilian, is available from the Defense Documentation Center located in Washington, D. C.

The most useful information provided by sources other than Natick Labs was that obtained from El Centro, specifically the reports published by Mr. Jay Boone (2, 3, 4, 5). Mr. Boone reported on tests performed on 183 parachutes which ranged in age from new to 15 years. Of 18 parachutes in the 15-year old group, only six still retained sufficient breaking strength to meet military specifications, but loss of strength was not detected in tear or burst strengths. He concluded that no effect could definitely be ascribed to age or to fatigue caused by use. Further, he suggested that the useful service life of a parachute should be counted from the time of opening of the containers in which they are packed upon shipment from the manufacturer, as there is often a two year waiting period before opening.

Although the types of tests conducted, the types of parachutes tested, and the number of testing facilities were many and varied, analysis of test results and conclu-

sions derived therefrom were all very similar in nature. The author reviewed numerous selected reports and publications and, in addition, visited various parachute test facilities located at the U. S. Army Natick Laboratories in Natick, Massachusetts, the U. S. Naval Aerospace Recovery Facility in El Centro, California, and the U. S. Air Force test facilities at Kelly Air Force Base in San Antonio, Texas and at Eglin Air Force Base in Fort Walton Beach, Florida. The repetitious nature of all the test programs, publications, and results reviewed was clearly evident.

Although use was not made of the data collected from other facilities, it was interesting to note the many testing procedures which are available for use in parachute strength analysis. In addition to the tests described, and used in this report, use could have also been made of burst strength tests, seam strength tests in both sectional and radial directions, tearing energy tests, fluidity tests, fatigue tests, abrasion tests, and air permeability tests. There are criteria for use with climatic chambers to test resistance to light, heat, color fastness, permanence of finish, effects of humidity, and effects of various dyes. In short, it is a science within itself to determine which tests are viable.

A complete bibliography of related studies on parachute strengths, age life studies, etc., is included at the

erd of this report.

CHAPTER IV

ANALYSIS OF DATA

Appendix F contains a complete listing of the data on both the reserve and the main parachute populations which was supplied to the author by Natick Laboratories. This information was recorded on 741 computer cards using 69 columns on each individual card. Each card represented one sample, and an explanation of the type of information and card column location is provided as follows:

Column 1	This column was used to record the type of parachute using the code 1 for reserves and the code 2 for mains.
Columns 2-7	Serial number of the parachute.
Columns 8-12	Break strength in the warp direction and recorded in pounds. A blank space in this column in the listing in Appendix F indicates that there was not a value recorded for this sample. This procedure is followed throughout the Appendix.
Columns 13-17	Break strength in the filling direction recorded in pounds.
Columns 18-22	Elongation at the time of break,

warp direction, recorded as a percentage.

Columns 23-27	Elongation at the time of break, filling direction, recorded as a percentage.
Columns 28-32	Tear strength in the warp direction recorded in pounds.
Columns 33-37	Tear strength in the filling direction recorded in pounds.
Column 38	Location from which the parachute was obtained. Numbers were used for coding purposes with number 1 representing Fort Benning, number 2 repre- Yuma, Arizona, number 3 representing Fort Bragg, number 4 representing Alaska, number 5 representing Southeast Asia, and number 6 representing the Canal Zone.
Columns 39-40	The number of the gore from which the sample was taken.
Columns 41-42	The panel from which the sample was obtained.
Columns 43-45	The age, recorded in months, of the parachute from the date of manufacture to the date of the test.

Columns 46-48 The number of recorded jumps for the parachute. A blank in the column in Appendix F indicates that this information has either been lost or destroyed. A zero in the column indicates that the parachute has never been used for a jump.

Columns 49-51 Break strength of the suspension lines recorded in pounds. A zero for this entry, as well as for the remaining entries discussed below, indicates that a value was not recorded.

Columns 52-55 Suspension line elongation at the time of break and recorded as a percentage.

Columns 56-59 Break strength of the first riser and recorded in pounds.

Columns 60-63 Break strength of the second riser and recorded in pounds.

Columns 64-66 Age of the first riser, recorded in months, from the date of manufacture to the date of test. Although the risers are a permanent part of the canopy assembly, it was found that

they usually had a different date of manufacture from the canopy.

Columns 67-69 Age of the second riser, recorded in months, from the date of manufacture to the date of test.

This data deck will be maintained on file and is available to interested parties.

Appendices A, B, C, D and E contain descriptive statistics which were calculated for various combinations of the information and data supplied on the computer cards. There were 105 reserve parachutes tested from which 201 samples were recorded and there were 110 main parachutes tested from which 540 samples were recorded. Each of the five appendices provide information concerning the variable under test (break strength, elongation, or tear strength), population size (N), mean value, standard deviation, variance and range of values for the population under consideration. In appendix A, the parachutes are compared by type, i.e., whether the sample was taken from a reserve parachute or from a main parachute. In Appendix B, the entire parachute population is examined as a function of age only. The age of the parachutes, from the date of manufacture to the date of test, varied from six to twelve years. In Appendix C, descriptive statistics are provided as a function of both type of parachute and the panel from which the sample was

taken. This analysis was undertaken to check for strength losses in the higher panels of the chutes as compared to the lower panels. During the opening of the chute, a much higher stress is subjected to the panels near the apex than to the panels located near the skirt. In Appendix D, an investigation of the parachute population is recorded as a function of age and type combined. Finally, in Appendix E, the parachute population is compared as a three-way function of type of parachute, age of parachute, and panel location.

The purpose of these five appendices was to provide the author a starting point from which to determine an experimental design for further testing. A large number of roughly drawn graphs were used to check for trends and correlations and to decide what type of statistical tests should be performed. Appendices G through L are used to record the results of a number of analysis of variance experiments that were designed and implemented as a result of the study of Appendices A through E.

Due to the inaccuracies associated with simply inspecting graphical representation of data, analysis of variance was chosen as the statistical procedure to be employed in analyzing the data in Appendix F. Analysis of variance has the advantage of taking the total variation contained in a set of data and reducing it into the components which can be associated with possible sources of

variability, i.e., it separates the variation that may be present into individual components and then these components may be analyzed in order to test certain hypotheses. Analysis of variance then shows that the variation between sample averages is or is not commensurate with the variation of the population. If the between sample variance is significantly greater than the within sample variance, it can be concluded that the samples were not, in fact, drawn from the same population (12).

The variance ratio test, or F test, is used to check for significant differences. The variance ratio is defined as F, which is equal to the greater estimate of the variance of the population divided by the lesser estimate of the variance of the population. The greater this variance ratio, the less likely it is that the treatment means are equal, since ideally the F ratio should approach unity. Tables have been created showing the value of F which will be exceeded with a given degree of probability for various sample sizes. Such a table was used to check for significance in each of the analysis of variance tests performed in this report (19).

In Appendices G, H, and I respectively, a single-factor analysis of variance was performed first on the reserve parachutes, then on the main parachutes, and finally on a combined population consisting of both. The single

factor considered was the age in years of the parachutes, from the date of manufacture to the date of destructive testing, as defined in Appendix B. Each Appendix contains the analysis of variance table with the "between years" variance defined as "YEAR" and the "within years" variance defined as "RESIDUAL" or "ERROR". The F values as found for each of the six different variables in each of the three populations are shown in Table 2, along with the critical F values at the one percent significance level (α=.01). The results of these single factor experiments were useful in that block designs, i.e., an equal number of replications per cell, were not necessary and, therefore, the entire set of data was included in the tests. The results of the tests were surprising as the reserve parachute population showed significantly greater strength losses with age than did the main parachute population. In all cases, with the exception of the elongation warp in the combined parachute population, the hypothesis that the mean strength values at each age period are equal was rejected at the one percent level. In fact, most of the values are significantly larger than the corresponding critical F values at the one percent level. It was expected that the main parachutes would show greater strength variation due to their much more frequent exposure to the elements and to the repeated stresses suffered as a

TABLE 2

Summary for One-way Analysis of Variance

Variable	F Values: Mains	F Critical
Break Strength Warp	6.[illegible]3	2.80
Break Strength Fill	11.35	2.80
Elongation Warp	2.98	2.80
Elongation Fill	8.74	2.80
Tear Strength Warp	5.00	2.80
Tear Strength Fill	4.56	2.80
Variable	**Reserves**	**F Critical**
Break Strength Warp	12.47	2.9[illegible]
Break Strength Fill	14.28	2.89
Elongation Warp	4.64	2.89
Elongation Fill	8.93	2.89
Tear Strength Warp	4.90	2.89
Tear Strength Fill	15.12	2.89
Variable	**Combined**	**F Critical**
Break Strength Warp	6.48	2.80
Break Strength Fill	10.76	2.80
Elongation Warp	1.32	2.80
Elongation Fill	10.07	2.80
Tear Strength Warp	7.38	2.80
Tear Strength Fill	11.97	2.80

result of their use. The reserve parachutes spend most of their use life in the container with periodic repacks being the only exposure to abuse that they receive. The initial implication is that using a parachute frequently is much better for its maintaining constant strength properties than in not using it at all. This theory is supported by the U. S. Navy Aerospace Recovery Facility in El Centro since, in a number of their publications, they have noticed an increase in strength of nylon due to a work hardening effect caused by the strains of the opening shock (4). An inspection of Appendix D which describes the descriptive statistics of the parachutes by type and by age shows that in the earlier years, the reserve parachutes have considerably better strength properties than the mains but these values fall off rapidly in the later years. During this period, the values of the mains appear to remain fairly constant when compared with the values of the reserves. Further statistical analysis appeared necessary as the hypothesis of equal means cannot safely be rejected using a completely randomized design without first testing all sources of variation.

To attempt to isolate the sources of variation and reduce the error variance estimate, it was necessary to perform a second analysis of variance. The tabulation of

these tests is given in Appendices J and K. A randomized complete block design was decided upon and was achieved by selecting data cards from the complete data set which would allow for equal replications within cells. In Appendix J, a two-way analysis of variance was performed upon the reserve parachute population using sample location (panel number) and age as the two factors. A good design could be accomplished only by having two replications per cel due to fewer tests having been performed on a per parachute basis in the reserve population. This analysis was run primarily as a control since the results were needed only for the purpose of comparison with the results of the same analysis run upon the main parachute population.

The panels were included as a factor, since as stated previously, most of the decelerating forces associated with the opening of the parachute are concentrated in the panels near the apex while the panels near the skirt of the chute experience very little strain. The purpose of this procedure was to determine if these high strain rates cause significant loss or gain of strength properties in localized areas of the canopy, and in so doing, determine the importance of recording the number of jumps to which a parachute has been subjected. Obviously, the panels on a reserve parachute would be expected to show no significantly

different strength properties, since the average reserve parachute will never be used for jumping except in an emergency. In Appendix K, the same analysis was run upon a selected portion of the main parachute population which contained five replications per cell. Since there were two factors of interest in this design, not only could the individual effects of age and panel location be determined but also their interaction. What this determines is whether or not an older parachute experiences a significant loss or gain in strength in certain areas of the canopy during opening shock while a newer parachute might not, or vice versa. Table 3 on the next page gives the F values recorded from Appendices J and K. In this table, double asterisks (**) are used to indicate significance at the one percent confidence level and single asterisks (*) are used to signify significance at the five percent confidence level.

The results of the two-factor experiments, listed in Table 3, compare favorably with the results obtained in the previous single-factor experiments in that the years' effect is clearly shown to be more pronounced in the reserve parachute population than in the main parachute population. In only one case (tear strength fill) was significant losses of strength shown between panels. As shown in the table, this occurred at the five percent confidence level in the

TABLE 3

[illegible] Analysis of Variance

[illegible]	Effect	F-Values Mains	F-Values Reserves
[illegible]	[illegible]	8.36**	[illegible]
	Panels	0.54	[illegible]
	Years-Panels	1.31	0.62
Break Strength Fill	Years	9.24**	[illegible]
	Panels	0.72	0.96
	Years-Panels	0.52	0.83
[illegible]	Years	3.60**	[illegible]
	Panels	0.35	[illegible]
	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]
	[illegible]	0.94	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
	Panels	2.02	0.24
	Years-Panels	0.59	[illegible]
[illegible] Fill	Years	[illegible]	[illegible]
	Panels	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]

reserve parachute population. Obviously, this strength variance could not have been caused by the effects of jumping, since the reserves are generally never used. Only the break strength warp in the main parachute population had a larger F value for years' effect than the respective reserve parachute population. This was contrary to what was observed in the single-factor experiment for the same variable. Although part of this difference can be attributed to different population sizes and associated degrees of freedom, the importance of searching for trends over the entire test range is emphasized rather than drawing conclusions from results obtained from any single variable analysis.

The results of the two-factor experiments having again implied that use may be better for a parachute as opposed to non-use, since the mains have less significant strength variation over a period of time, a three-factor experiment was designed to be performed upon the main parachute population. A randomized complete block design was again used with the factors to be considered being age, panel location, and number of jumps. Since there are no jumps recorded for reserve parachutes, they were excluded from this analysis. This analysis was performed to better determine the effect of jumps on strength losses. A new

set of data cards was chosen with five replications per cell. Only 215 samples were used in this experiment due to a substantial amount of missing information concerning the number of jumps. The fact remained that the main parachutes still had lower average strength values than did the reserve parachutes, since the only conclusion which could be reached from the previous tests was that strength losses occurred more rapidly with age in the reserve population than in the main population. In Appendix L, the results of the three-factor analysis are shown and a summary of the F values with indicated levels of significance is given in Table 4.

As expected, there was a consistently significant difference for the effect of years at the one percent level. What was not expected was a similar significant effect traceable to the factor of jumps. The effect of the jumps was pronounced in every case at the one percent level except in the case of the elongation fill test, which was also the only case which did not show some significance for the effect of years. A years and jumps interaction was detected at the one percent level in both elongation tests and in both tear strength tests. No interaction at all was detected in the break strength tests. The implication of this interaction is that either the older or the newer parachutes are more affected, as to strength losses or gains, from the

TABLE 3

[illegible] Analysis of Variance

[illegible]	Effect	F-Value
	Years	10.[illegible]**
	Jumps	[illegible]**
	Years-Jumps	[illegible]
	Panels	[illegible]
	Years-Panels	[illegible]
	Jumps-Panels	[illegible]
	Years-Jumps-Panels	0.[illegible]
[illegible]	Years	[illegible]**
	Jumps	[illegible]**
	Years-Jumps	[illegible]
	Panels	[illegible]
	Years-Panels	[illegible]
	Jumps-Panels	[illegible]
	Years-Jumps-Panels	0.[illegible]
[illegible]	Years	[illegible]**
	Jumps	[illegible]**
	Years-Jumps	[illegible]**
	Panels	0.[illegible]
	Years-Panels	0.[illegible]
	Jumps-Panels	0.58
	Years-Jumps-Panels	0.03

(continued on next page)

Variable	Effect	F-Values
Elongation Fill	Years	1.66
	Jumps	2.21*
	Years-Jumps	2.75**
	Panels	1.36
	Years-Panels	0.89
	Jumps-Panels	0.91
	Years-Jumps-Panels	0.38
Tear Strength Warp	Years	2.95*
	Jumps	5.66**
	Years-Jumps	3.51**
	Panels	2.48
	Years-Panels	0.73
	Jumps-Panels	0.77
	Years-Jumps-Panels	0.22
Tear Strength Fill	Years	5.95**
	Jumps	4.96**
	Years-Jumps	4.34**
	Panels	2.57*
	Years-Panels	0.85
	Jumps-Panels	1.14
	Years-Jumps-Panels	0.75

effects of being jumped.

If the results of the three-factor analysis could be assumed to be correct, the number of jumps would have to be accepted as an important criteria in determining the age life of a parachute for useful purposes. However, subsequent to this test, it has been discovered that most of the logbooks of the parachutes, in which the number of jumps are recorded, are in themselves very inaccurate. At the time of issuance of the parachute, a logbook is included in the pack and is supposed to remain there throughout the use-life of the parachute. Each jump for which the parachute is used is then supposed to be recorded individually in this book. Virtually all of the original logbooks have been destroyed or lost. The general corrective procedure is then to issue a new logbook and to allow ten jumps for each year from the date of manufacture of the parachute. A close inspection of the data in Appendix F verifies the suspicious nature of many of the values for jumps when compared with age. Typically, a new logbook for a parachute of around seven years of age would carry the entry "70 jumps carried over from first logbook" and then might have three or four individual jumps recorded. Approximately 40 percent of the parachutes reflected these similarities of jumps proportional to age.

Since many of the jumps have more or less been coded to reflect the value of the years of age, the jumps effect could then carry the same significant difference levels in any analysis of variance results, i.e., an increase in the number of years of age of a parachute is nearly always accompanied by a parallel incremental increase in the number of jumps. However, the effect is too pronounced to be disregarded.

The logical conclusion must be that the data concerning the jumps included in this report is highly unreliable. This only increases the importance of the two-factor and one-factor analyses which compared a population of parachutes (reserves) in which the number of jumps were known to be near zero to a population of parachutes (mains) in which a number of jumps were known to have been accumulated. The results of the three-way analysis, however, still cannot be disregarded as they are in direct contrast to the results of the single-factor and double-factor experiments.

In one of the Natick publications by Cowie and Yelland (8), a single-factor analysis of variance was performed, using the number of jumps as the treatment effect. This was the only previous instance of the use of this procedure for testing purposes that the author could find; however, the results of the Cowie and Yelland experiment

were of doubtful worth since they failed to realize that an age effect was also present. The parachutes were chosen only as a function of the number of jumps present and no effort was made to determine dates of manufacture.

CHAPTER V

RECOMMENDATIONS AND CONCLUSIONS

Summary of Recommendations

The following recommendations are made as a result of the analysis of the data in this report and of the analysis of information accumulated from supplementary sources:

(1) An immediate two-year extension to the current ten-year age limit on T-10 troop-type personnel parachutes. This two-year extension should give sufficient time for recommendation (2) to be completed.

(2) A controlled test plan, as will be designed in Part II of this report, be immediately implemented in an effort to justify further extensions of age life.

(3) Current military specifications be revised to include two separate sets of requirements: one to maintain quality of parachutes received from the manufacturer and one to limit

age life on used parachutes.

(4) Centralization of all parachute testing into one tri-Service facility should be investigated and effected.

Justification for Immediate Age Life Extension

Investigation of U. S. Army records for the past seven years has established that there were over 2,040,000 military paratrooper jumps during this period. With an average of over 291,000 personnel jumps per year, the records indicate and substantiate the fact that there has never been a fatality due to sub-standard fabric strength (21). If the total population of parachutes used during this period could be determined, along with the average number of jumps per chute, a very accurate reliability prediction model could be developed. This is an area of recommended study in Part II of this report, and even with the data currently on hand, i.e., 2,040,000 jumps without a failure, the logical conclusion must be that the current age life limitations are much too confined. An immediate extension is further justified due to the highly reliable reserve parachute back-up system.

This is not a hazardous decision to make, since in any type of parachute system failure, either canopy panels or suspension lines would be expected to be the first components to

fail, as evidenced by tests at Eglin Air Force Base and at El Centro, California. In the Eglin tests, overage T-10 parachutes were tested to determine the feasibility of converting them into cargo chutes. A large number of failures due to panels blowing apart were encountered when high velocity (over 300 knots) drops were attempted. However, damage was usually limited to just one or two panels, and this would not necessarily cause loss of an intended cargo. El Centro managed to break as many as three suspension lines, without canopy damage, at 300 knots in airspeed and achieving an opening shock force greater than 5000 pounds (21). The El Centro tests were conducted on 24 foot diameter T-10 reserves and, even with the broken suspension lines, the descent rate was not affected.

Based on the results of these tests at Eglin and El Centro, it was noted that failures usually occur independently and not all panels or lines will fail at the same time. Initial failures then should do little more than cause an accelerated rate of descent to the paratrooper. In case of too high of a rate of descent, deployment of the reserve would be initiated. The author has witnessed a number of cases, in sport parachuting, in which jumpers have had panels blown out or suspension lines broken during a jump and they still landed safely, discovering the damage

only by post-jump inspection. These blown panels and broken suspenion lines were not due to strength losses, but rather to poor packing procedures, as evidenced by melted material around the panels and on the lines. When a suspension line becomes trapped over the top of the canopy during opening, it will often rip down the canopy with a tremendous force thus burning through the panel and, in many cases, the line also. Based upon the number of recorded jumps in the past seven years and upon the perfect record of no failures, it is not unrealistic to envisage a considerable increase in the current age life restrictions. With an improvement in storage conditions, testing techniques, and maintenance programs, even a much greater extension could be justified.

Development of a Controlled Test Plan

In Part II of this report, a recommended test procedure will be developed for parachute strength analysis. Unfortunately, experimental design for the purpose of hypothesis testing has seemingly never been employed in any past examinations of parachute populations. If the correct method of designing an experiment and then collecting data as dictated by that design had been instituted, much more reliable results could have been obtained in a much shorter period of time and using a vastly smaller number of para-

chutes. Collecting random data and then attempting to build an experiment around that data is a totally unacceptable procedure. A controlled environment experiment, in which parachutes of known ages, and having been used for no jumps (such as reserves), could be augmented both for the purpose of a hypothesis test and for the construction of a reliability prediction model. The parachutes might, for example, be subjected to varying numbers of jumps by use of a parachute jump tower and selected strength tests could then be performed.

Utilization of the test plan as presented in Part II could conceivably establish, for the first time, a reliable determination of the safe use life both as a function of age and jumps.

Military Specifications

One of the alarming facts associated with current military specifications is the manner in which they were derived. The minimum requirements were established in an effort to insure high quality from the manufacturer; however, this was accomplished after determining what type of requirements the manufacturer could easily meet and not as a result of an analysis of structural requirements. It was feared that lowering specification requirements to what might be actually required would be accompanied by a

reduction in quality from the manufacturer. As a result, the parachutes are probably tremendously over designed.

An interview with one individual at Kelly Air Force Base, who participated in the original drafting of the military specifications for parachutes, confirmed that the strength standards were established on the basis of what the manufacturer could safely produce and not on the basis of what amount of strength is required. The fact even remains that some requirements have been raised over the years (3) rather than lowered, yet there has never been a recorded fatality due to sub-standard fabric strength (21).

The current physical properties requirements might safely be reduced for the purpose of extending useful service life of the parachute if only an accurate estimate of strength requirements could be obtained. If this were done, the requirements as now found in military standards could still be kept as a method of maintaining quality at the manufacturing level, while the new requirements would be used on parachutes already in service for the purpose of measuring use life.

Merging of Test Facilities

There has been numerous programs of testing over the years by all three branches of the Service. These tests have all been very similar in scope and method, in that they

have compared the existing physical properties of the parachutes to the existing requirements as outlined in military specifications. Centralization of all parachute testing would greatly reduce the redundancy now being experienced. Establishment of a single facility in charge of all testing of parachutes for all three Services would greatly reduce the number of personnel required and the wholesale destruction of parachutes.

Conclusions from Analysis of Variance Tests

The analysis of variance tests have demonstrated that there are highly significant differences in the physical properties of parachute canopies for different age periods. Graphical analysis of the data in Appendices A through E illustrated the lack of confidence which must be placed upon the current sample collection and testing procedures. Values fluctuated noticeably between age periods for the different variables, and in many cases lower strength and elongation values were recorded for the newer parachutes as opposed to the older parachutes.

One conclusion that can be drawn from these tests is that the cessation of the recording of the number of jumps per parachute cannot be justified from an engineering standpoint. Although many entries in the parachute logbooks may be missing or ambiguous, enough of the data appears accurate

to seriously raise a question concerning the highly significant differences found in the three-factor analysis of variance. Since the implications of the results of the single-factor and double-factor experiments are in direct contrast to the results of the three-factor experiments, no conclusions can be made except that a more controlled data collection process is needed.

Unfortunately, the analysis of the true forces experienced by the canopy, suspension lines, and risers during the deployment sequence is extremely difficult. There have been attempts to theoretically analyze these forces (28, 29), however, experimental verification of the results are next to impossible to obtain, due to the multi-directional distribution of the forces throughout the components of the parachute. Actually it is very questionable whether any of the destructive testing procedures now employed are really sufficient indicators of parachute reliability. It has been suggested by studies conducted at El Centro (4) that the burst strength test might well prove to be the most efficient and reliable test procedure to be used upon the parachute canopy, since the parachute material is tested as a complete structure and the results reflect the resistance to rupture of the material in all of the principal stress directions combined. Again the question remains, though, as to what minimum allowable strength

should be maintained while developing a valid risk-cost equation.

Until such a technique is devised to accurately establish minimum physical properties requirements for a parachute, the results and conclusions of all current testing programs and the minimum physical properties standards, as established by military standards and other agencies, must be treated as purely conjecture.

Future analysis of variance experiments might include a design to compare reserve parachutes directly to main parachutes without having to draw assumptions from the size of the F values. Such a design was not possible in this report due to unequal number of replications per cell for the data recorded. In addition, it was noted in one of El Centro's reports that parachutes manufactured after 1966 were made of a new ultra-violet resistant yarn, and this effect was not included as a factor in any of the experiments in this report due to lack of information. The manufacturer from which each parachute was obtained was not considered a factor, as all of the manufacturers purchase their materials and components from the same sources.

APPENDIX

APPENDIX A

DESCRIPTIVE STATISTICS BY TYPE OF PARACHUTE

(RESERVE PARACHUTES VS. MAIN PARACHUTES)

Reserve Parachutes

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	201	47.16	3.95	15.62
	[Range = 38.00 to 62.00]			
Break Strength (fill)	201	45.90	4.52	20.48
	[Range = 25.00 to 56.00]			
Elongation (warp)	201	23.53	3.76	14.18
	[Range = 13.00 to 34.00]			
Elongation (fill)	201	28.96	3.79	14.43
	[Range = 16.00 to 36.00]			
Tear Strength (warp)	201	7.04	0.95	0.91
	[Range = 3.10 to 10.80]			
Tear Strength (fill)	201	6.78	1.01	1.03
	[Range = 4.30 to 10.80]			

Main Parachutes

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	525	44.81	3.83	14.69
	[Range = 26.50 to 55.00]			
Break Strength (fill)	525	44.10	3.75	14.13
	[Range = 26.50 to 53.30]			

Variable	N	Mean	Std. Dev.	Variance
Elongation (warp)	525	25.29	4.34	18.90
	[Range = 15.00 to 44.30]			
Elongation (fill)	525	27.48	4.26	18.19
	[Range = 16.70 to 36.60]			
Tear Strength (warp)	525	7.45	1.42	2.03
	[Range = 3.20 to 11.70]			
Tear Strength (fill)	525	7.46	1.15	1.32
	[Range = 3.50 to 11.00]			

APPENDIX B

DESCRIPTIVE STATISTICS BY AGE OF PARACHUTES

(RESERVE AND MAIN PARACHUTES COMBINED)

6 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	6	43.45	3.57	12.75
	[Range = 40.00 to 50.00]			
Break Strength (fill)	6	39.50	3.01	9.09
	[Range = 36.70 to 45.00]			
Elongation (warp)	6	23.05	3.71	13.77
	[Range = 20.00 to 30.00]			
Elongation (fill)	6	27.40	4.02	16.18
	[Range = 20.00 to 30.00]			
Tear Strength (warp)	6	6.80	0.78	0.62
	[Range = 6.00 to 7.90]			
Tear Strength (fill)	6	7.26	0.99	0.99
	[Range = 6.30 to 8.00]			

7 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	90	45.86	3.44	11.89
	[Range = 33.00 to 52.50]			
Break Strength (fill)	90	45.56	3.86	14.96
	[Range = 36.50 to 53.30]			

Variable	N	Mean	Std. Dev.	Variance
Elongation (warp)	90	25.70	5.83	34.01
	[Range = 13.00 to 44.30]			
Elongation (fill)	90	25.93	4.66	21.77
	[Range = 16.70 to 35.80]			
Tear Strength (warp)	90	7.89	1.31	1.73
	[Range = 5.10 to 11.30]			
Tear Strength (fill)	90	8.00	1.16	1.35
	[Range = 5.40 to 10.80]			

8 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	62	45.88	4.96	24.63
	[Range = 31.00 to 62.00]			
Break Strength (fill)	62	44.49	4.33	18.77
	[Range = 35.00 to 54.00]			
Elongation (warp)	62	23.88	4.12	17.03
	[Range = 16.70 to 33.30]			
Elongation (fill)	62	26.34	4.12	17.03
	[Range = 18.40 to 33.00]			
Tear Strength (warp)	62	6.94	0.97	0.94
	[Range = 4.90 to 10.00]			
Tear Strength (fill)	62	6.94	0.96	0.92
	[Range = 5.00 to 9.50]			

9 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	142	46.69	4.11	16.95
	[Range = 31.60 to 55.00]			
Break Strength (fill)	142	45.96	3.68	13.61
	[Range = 35.60 to 54.00]			
Elongation (warp)	142	24.85	3.63	13.20
	[Range = 15.00 to 34.40]			
Elongation (fill0	142	29.03	3.81	14.56
	[Range = 18.90 to 35.50]			
Tear Strength (warp)	142	7.49	1.17	1.38
	[Range = 5.00 to 11.70]			
Tear Strength (fill)	142	7.48	0.90	0.81
	[Range = 4.60 to 10.60]			

10 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	138	45.28	3.74	14.06
	[Range = 26.50 to 53.00]			
Break Strength (fill)	138	44.40	4.00	16.07
	[Range = 25.00 to 52.00]			
Elongation (warp)	138	24.77	4.49	20.23
	[Range = 16.00 to 35.50]			
Elongation (fill)	138	27.26	4.19	17.58
	[Range = 16.00 to 36.60]			

Variable	N	Mean	Std. Dev.	Variance
Tear Strength (warp)	138	6.95	1.39	1.93
	[Range = 3.10 to 10.70]			
Tear Strength (fill)	138	6.98	1.31	1.71
	[Range = 3.70 to 11.00]			

11 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	169	45.47	4.02	16.16
	[Range = 35.30 to 56.00]			
Break Strength (fill)	169	44.72	4.21	17.78
	[Range = 33.00 to 56.00]			
Elongation (warp)	169	24.71	3.86	14.95
	[Range = 13.00 to 33.30]			
Elongation (fill)	169	28.07	3.80	14.49
	[Range = 20.00 to 35.50]			
Tear Strength (warp)	169	7.20	1.35	1.83
	[Range = 3.80 to 11.20]			
Tear Strength (fill0	169	6.99	1.17	1.38
	[Range = 3.50 to 10.30]			

12 Years Old

Variable	N	Mean	Std. Dev.	Variance
Break Strength (warp)	119	43.80	3.41	11.65
	[Range = 32.00 to 51.00]			

Variable	N	Mean	Std. Dev.	Variance
Break Strength (fill)	119	42.60	3.38	11.48
	[Range = 29.70 to 51.00]			
Elongation (warp)	119	24.80	3.87	14.99
	[Range = 16.60 to 35.50]			
Elongation (fill)	119	29.34	3.89	15.18
	[Range = 21.10 to 36.60]			
Tear Strength (warp)	119	7.61	1.35	1.83
	[Range = 4.60 to 11.20]			
Tear Strength (fill)	119	7.39	0.99	0.98
	[Range = 4.70 to 9.60]			

APPENDIX C

DESCRIPTIVE STATISTICS BY TYPES AND PANELS OF PARACHUTES

(RESERVE AND MAIN PARACHUTES COMBINED)

TYPE=1 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	59	47.276271	4.390167	19.273565	38.300000	62.000000
BREAKFIL	59	46.147458	4.437317	19.689778	36.000000	54.000000
ELONGWAR	59	23.615254	3.935507	15.488212	13.000000	34.000000
ELONGFIL	59	28.915254	3.992614	15.940970	16.000000	36.000000
TEARWARP	59	6.991525	0.927927	0.861048	4.800000	9.600000
TEARFILL	59	6.932203	1.073697	1.152824	4.500000	10.800000

TYPE=1 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	85	47.327059	3.674636	13.502950	38.000000	54.000000
BREAKFIL	85	46.100000	4.148149	17.207143	33.000000	55.000000
ELONGWAR	85	23.277647	3.723170	13.861994	13.000000	33.000000
ELONGFIL	85	29.023529	3.651407	13.332773	17.000000	36.000000
TEARWARP	85	7.067059	0.902132	0.813842	5.300000	9.300000
TEARFILL	85	6.770000	1.128795	1.274179	4.300000	9.900000

TYPE=1 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	57	46.821053	3.927501	15.425263	39.000000	55.000000
BREAKFIL	57	45.359649	5.151902	26.542093	25.000000	56.000000
ELONGWAR	57	23.829825	3.693235	13.639987	13.000000	32.000000
ELONGFIL	57	28.912281	3.878884	15.045739	17.000000	33.000000
TEARWARP	57	7.069298	1.064599	1.133371	3.100000	10.800000
TEARFILL	57	6.649123	0.731650	0.535312	4.600000	8.900000

TYPE=2 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	73	45.041096	3.809120	14.509399	31.600000	51.500000
BREAKFIL	73	44.346575	4.102509	16.830578	33.000000	52.500000
ELONGWAR	73	25.658904	4.407091	19.422454	16.700000	38.200000
ELONGFIL	73	26.619178	3.968510	15.749072	20.000000	34.200000
TEARWARP	73	7.706849	1.368427	1.872591	4.700000	11.300000
TEARFILL	73	7.616438	1.064583	1.133337	4.300000	10.100000

TYPE=2 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	129	44.817054	3.817110	14.570332	35.300000	55.000000
BREAKFIL	129	43.883721	3.486308	12.154342	29.700000	53.300000
ELONGWAR	129	24.855814	4.345596	18.884204	15.600000	41.000000
ELONGFIL	129	27.825581	4.170699	17.394731	17.800000	36.600000
TEARWARP	129	7.414729	1.606972	2.582359	3.200000	11.200000
TEARFILL	129	7.420155	1.257998	1.582559	3.900000	11.000000

TYPE=2 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	120	44.541667	3.647437	13.303796	31.000000	53.000000
BREAKFIL	120	44.400000	3.375194	11.391933	36.700000	53.000000
ELONGWAR	120	25.510000	4.791526	22.958723	15.000000	44.300000
ELONGFIL	120	27.526667	4.513095	20.368022	17.800000	36.600000
TEARWARP	120	7.312500	1.383551	1.914212	3.500000	10.700000
TEARFILL	120	7.290833	1.165758	1.358991	3.700000	10.100000

TYPE=2 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	107	45.264486	3.649819	13.321180	35.000000	55.000000
BREAKFIL	107	44.060748	3.870633	14.983350	34.100000	52.700000
ELONGWAR	107	25.561682	3.951538	15.614650	16.700000	35.500000
ELONGFIL	107	27.774766	4.324832	18.704169	16.700000	36.000000
TEARWARP	107	7.293458	1.246449	1.553636	4.600000	10.500000
TEARFILL	107	7.459813	0.981706	0.963747	4.600000	10.800000

TYPE=2 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	96	44.496875	4.294708	18.444516	26.500000	52.500000
BREAKFIL	96	43.881250	4.189946	17.555645	26.500000	51.500000
ELONGWAR	96	25.041667	4.167156	17.365193	16.700000	33.300000
ELONGFIL	96	27.329167	4.212536	17.745456	18.400000	35.800000
TEARWARP	96	7.676042	1.432094	2.050894	3.800000	11.700000
TEARFILL	96	7.646875	1.209607	1.463148	3.500000	10.500000

APPENDIX D

DESCRIPTIVE STATISTICS BY TYPES AND AGES OF PARACHUTES

(RESERVE AND MAIN PARACHUTES COMBINED)

TYPE=1 YEAR=6

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	50.000000	0.0	0.0	50.000000	50.000000
BREAKFIL	1	45.000000	0.0	0.0	45.000000	45.000000
ELONGWAR	1	30.000000	0.0	0.0	30.000000	30.000000
ELONGFIL	1	20.000000	0.0	0.0	20.000000	20.000000
TEARWARP	1	7.900000	0.0	0.0	7.900000	7.900000
TEARFILL	1	8.800000	0.0	0.0	8.800000	8.800000

TYPE=1 YEAR=7

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	8	49.125000	2.167124	4.696429	46.000000	52.000000
BREAKFIL	8	46.875000	4.257347	18.125000	39.000000	51.000000
ELONGWAR	8	21.125000	6.034129	36.410714	13.000000	30.000000
ELONGFIL	8	26.250000	5.418223	29.357143	17.000000	30.000000
TEARWARP	8	8.037500	1.136332	1.291250	6.300000	9.600000
TEARFILL	8	8.312500	1.577917	2.489821	6.000000	10.800000

TYPE=1 YEAR=8

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	13	49.615385	4.388213	19.256410	44.000000	62.000000
BREAKFIL	13	49.923077	2.531848	6.410256	46.000000	54.000000
ELONGWAR	13	25.076923	3.546396	12.576923	17.000000	30.000000
ELONGFIL	13	30.692308	2.496151	6.230769	24.000000	33.000000
TEARWARP	13	6.707692	0.388290	0.150769	6.100000	7.300000
TEARFILL	13	6.153846	0.352646	0.124359	5.700000	7.000000

TYPE=1 YEAR=9

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	22	50.318182	2.589105	6.703463	44.000000	55.000000
BREAKFIL	22	49.409091	2.594116	6.729437	43.000000	54.000000
ELUNGWAR	22	22.545455	3.143059	9.878788	17.000000	30.000000
ELUNGFIL	22	26.772727	2.827279	7.993506	23.000000	33.000000
TEARWARP	22	7.379545	0.824716	0.680157	5.200000	9.300000
TEARFILL	22	7.398455	0.744009	0.553550	6.100000	8.500000

TYPE=1 YEAR=10

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	39	45.948718	3.886202	15.102564	40.000000	53.000000
BREAKFIL	39	44.179487	4.930420	24.309042	25.000000	52.000000
ELUNGWAR	39	21.666667	2.895853	8.385965	16.000000	30.000000
ELONGFIL	39	26.128205	4.617926	21.325236	16.000000	33.000000
TEARWARP	39	6.534615	0.970699	0.942257	3.100000	8.200000
TEARFILL	39	6.101282	0.922988	0.851905	4.300000	8.600000

TYPE=1 YEAR=11

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	63	48.349206	3.694629	13.650282	38.000000	56.000000
BREAKFIL	63	47.444444	4.188224	17.541219	33.000000	56.000000
ELUNGWAR	63	23.936508	3.252161	10.576549	13.000000	33.000000
ELUNGFIL	63	29.793651	2.896932	8.392217	20.000000	33.000000
TEARWARP	63	7.043651	0.679984	0.462379	5.300000	8.400000
TEARFILL	63	6.557937	0.701450	0.492033	5.000000	8.500000

TYPE=1 YEAR=12

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	55	44.507273	2.823831	7.974020	38.300000	50.000000
BREAKFIL	55	42.885455	2.999223	8.995340	35.000000	48.000000
ELONGWAR	55	24.658182	4.067654	16.545811	16.600000	34.000000
ELONGFIL	55	30.236364	2.993596	8.961616	23.000000	36.000000
TEARWARP	55	7.196364	1.125786	1.267394	5.500000	10.800000
TEARFILL	55	7.170000	0.933561	0.871537	5.600000	9.400000

TYPE=2 YEAR=6

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	5	42.140000	1.751571	3.068000	40.000000	44.600000
BREAKFIL	5	38.400000	1.514926	2.295000	36.700000	40.300000
ELONGWAR	5	21.660000	1.650152	2.723000	20.000000	23.300000
ELONGFIL	5	28.880000	1.948589	3.797000	25.500000	30.000000
TEARWARP	5	6.580000	0.641872	0.412000	6.000000	7.400000
TEARFILL	5	6.960000	0.730068	0.533000	6.300000	8.100000

TYPE=2 YEAR=7

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	82	45.546341	3.392737	11.510665	33.000000	52.500000
BREAKFIL	82	45.434146	3.833163	14.693141	36.500000	53.300000
ELONGWAR	82	26.146341	5.652494	31.956344	15.000000	44.300000
ELONGFIL	82	25.907317	4.623605	21.377724	16.700000	35.800000
TEARWARP	82	7.680488	1.338918	1.792701	5.100000	11.300000
TEARFILL	82	7.976829	1.121980	1.258839	5.400000	10.800000

TYPE=2 YEAR=8

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	49	44.900000	4.662349	21.737500	31.000000	51.800000
BREAKFIL	49	43.040816	3.482032	12.124549	35.000000	50.300000
ELONGWAR	49	23.573469	4.244986	18.019906	16.700000	33.300000
ELONGFIL	49	25.195918	3.691937	13.630400	18.400000	31.600000
TEARWARP	49	7.012245	1.069391	1.143597	4.900000	10.000000
TEARFILL	49	7.151020	0.966334	0.933801	5.000000	9.500000

TYPE=2 YEAR=9

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	120	46.026667	4.003480	16.027854	31.600000	55.000000
BREAKFIL	120	45.339167	3.515136	12.356184	35.600000	53.000000
ELONGWAR	120	25.277500	3.568571	12.734700	15.000000	34.400000
ELONGFIL	120	29.080833	3.979407	15.835680	18.900000	35.500000
TEARWARP	120	7.514167	1.232494	1.519041	5.000000	11.700000
TEARFILL	120	7.496667	0.933767	0.871922	4.600000	10.600000

TYPE=2 YEAR=10

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	99	45.024242	3.681339	13.555937	26.500000	53.000000
BREAKFIL	99	44.500000	3.607560	13.014490	26.500000	51.500000
ELONGWAR	99	26.005051	4.434935	19.668648	17.800000	35.500000
ELONGFIL	99	27.706061	3.950480	15.606289	18.400000	36.600000
TEARWARP	99	7.126263	1.495748	2.237262	3.200000	10.700000
TEARFILL	99	7.330303	1.281696	1.642746	3.700000	11.000000

TYPE=2 YEAR=11

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	106	43.761321	3.143991	9.884680	35.300000	49.500000
BREAKFIL	106	43.104717	3.318617	11.013216	33.600000	50.500000
ELONGWAR	106	25.180189	4.134925	17.097604	16.700000	33.300000
ELONGFIL	106	27.046226	3.923462	15.393557	20.000000	35.500000
TEARWARP	106	7.303774	1.624276	2.638271	3.800000	11.200000
TEARFILL	106	7.262264	1.321143	1.745420	3.500000	10.300000

TYPE=2 YEAR=12

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	64	43.195312	3.765610	14.179819	32.000000	51.000000
BREAKFIL	64	42.367187	3.697063	13.668271	29.700000	51.000000
ELONGWAR	64	24.929687	3.723102	13.861486	16.700000	35.500000
ELONGFIL	64	28.570312	4.411158	19.458311	21.100000	36.600000
TEARWARP	64	7.965625	1.437283	2.065784	4.600000	11.200000
TEARFILL	64	7.593750	1.007413	1.014881	4.700000	9.600000

APPENDIX E

DESCRIPTIVE STATISTICS BY TYPES, PANELS AND AGES OF PARACHUTES

(RESERVE AND MAIN PARACHUTES COMBINED)

TYPE=1 YEAR=6 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	50.000000	0.0	0.0	50.000000	50.000000
BREAKFIL	1	45.000000	0.0	0.0	45.000000	45.000000
ELONGWAR	1	30.000000	0.0	0.0	30.000000	30.000000
ELONGFIL	1	20.000000	0.0	0.0	20.000000	20.000000
TEARWARP	1	7.900000	0.0	0.0	7.900000	7.900000
TEARFILL	1	8.800000	0.0	0.0	8.800000	8.800000

TYPE=1 YEAR=7 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	2	47.500000	2.121320	4.500000	46.000000	49.000000
BREAKFIL	2	48.000000	4.242641	18.000000	45.000000	51.000000
ELONGWAR	2	21.500000	12.020815	144.500000	13.000000	30.000000
ELONGFIL	2	21.500000	2.121320	4.500000	20.000000	23.000000
TEARWARP	2	8.250000	1.909188	3.645000	6.900000	9.600000
TEARFILL	2	9.250000	2.192031	4.805000	7.700000	10.800000

TYPE=1 YEAR=7 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	6	49.666667	2.065591	4.266667	47.000000	52.000000
BREAKFIL	6	46.500000	4.593474	21.100000	39.000000	51.000000
ELONGWAR	6	21.000000	4.690416	22.000000	13.000000	27.000000
ELONGFIL	6	27.833333	5.307228	28.166667	17.000000	30.000000
TEARWARP	6	7.966667	1.026970	1.054667	6.300000	8.900000
TEARFILL	6	8.000000	1.433876	2.056000	6.000000	9.900000

TYPE=1 YEAR=8 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	4	51.750000	7.041543	49.583333	46.000000	62.000000
BREAKFIL	4	50.250000	2.500000	6.250000	47.000000	53.000000
ELONGWAR	4	24.250000	1.892969	3.583333	23.000000	27.000000
ELONGFIL	4	29.250000	3.774917	14.250000	24.000000	33.000000
TEARWARP	4	6.875000	0.531507	0.282500	6.100000	7.300000
TEARFILL	4	6.250000	0.556776	0.310000	5.700000	7.000000

TYPE=1 YEAR=8 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	6	48.500000	2.880972	8.300000	44.000000	51.000000
BREAKFIL	6	50.166667	1.834848	3.366667	48.000000	53.000000
ELONGWAR	6	25.333333	4.082483	16.666667	17.000000	27.000000
ELONGFIL	6	31.500000	1.643168	2.700000	30.000000	33.000000
TEARWARP	6	6.550000	0.327109	0.107000	6.300000	7.200000
TEARFILL	6	5.983333	0.147196	0.021667	5.800000	6.100000

TYPE=1 YEAR=8 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	3	49.000000	2.645751	7.000000	46.000000	51.000000
BREAKFIL	3	49.000000	4.358899	19.000000	46.000000	54.000000
ELONGWAR	3	25.666667	5.131601	26.333333	20.000000	30.000000
ELONGFIL	3	31.000000	1.732051	3.000000	30.000000	33.000000
TEARWARP	3	6.800000	0.264575	0.070000	6.500000	7.000000
TEARFILL	3	6.366667	0.230940	0.053333	6.100000	6.500000

TYPE=1 YEAR=9 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	7	50.857143	1.951800	3.809524	47.000000	53.000000
BREAKFIL	7	50.285714	1.496026	2.238095	49.000000	53.000000
ELONGWAR	7	22.857143	2.609506	6.809524	18.000000	27.000000
ELONGFIL	7	26.571429	2.699206	7.285714	23.000000	30.000000
TEARWARP	7	7.435714	0.784599	0.615595	6.500000	8.900000
TEARFILL	7	7.821429	0.401930	0.161548	7.400000	8.450000

TYPE=1 YFAR=9 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	9	49.888889	2.472066	6.111111	45.000000	54.000000
BREAKFIL	9	49.555556	2.068279	4.277778	46.000000	53.000000
ELONGWAR	9	21.777778	3.666667	13.444444	17.000000	30.000000
ELONGFIL	9	28.888889	2.848001	8.111111	23.000000	33.000000
TEARWARP	9	7.533333	0.924662	0.855000	6.200000	9.300000
TEARFILL	9	7.477778	0.747960	0.559444	6.200000	8.500000

TYPE=1 YEAR=9 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	6	50.333333	3.614784	13.066667	44.000000	55.000000
BREAKFIL	6	48.166667	3.970726	15.766667	43.000000	54.000000
ELONGWAR	6	23.333333	3.141125	9.866667	20.000000	27.000000
ELONGFIL	6	28.833333	3.430258	11.766667	23.000000	33.000000
TEARWARP	6	7.083333	0.773089	0.597667	6.400000	8.200000
TEARFILL	6	6.775000	0.712566	0.507750	6.100000	8.000000

TYPE=1 YEAR=10 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	12	46.500000	4.056420	16.454545	40.000000	53.000000
BREAKFIL	12	44.750000	3.467380	12.022727	40.000000	50.000000
ELONGWAR	12	21.083333	2.968267	8.810606	16.000000	27.000000
ELONGFIL	12	27.583333	4.925967	24.265152	16.000000	33.000000
TEARWARP	12	6.566667	1.062016	1.127879	4.800000	8.200000
TEARFILL	12	6.262500	0.943187	0.889602	4.500000	7.900000

TYPE=1 YEAR=10 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	15	46.133333	3.888934	15.123810	40.000000	51.000000
BREAKFIL	15	44.533333	3.852025	14.838095	39.000000	50.000000
ELONGWAR	15	21.066667	2.153624	4.638095	17.000000	23.000000
ELONGFIL	15	26.400000	3.906039	15.257143	20.000000	33.000000
TEARWARP	15	6.653333	0.757691	0.574095	5.300000	7.900000
TEARFILL	15	5.980000	1.136536	1.291714	4.300000	8.600000

TYPE=1 YEAR=10 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	12	45.166667	3.927371	15.424242	40.000000	51.000000
BREAKFIL	12	43.166667	7.171070	51.424242	25.000000	52.000000
ELONGWAR	12	23.000000	3.384456	11.454545	20.000000	30.000000
ELONGFIL	12	24.333333	4.905161	24.060606	17.000000	33.000000
TEARWARP	12	6.354167	1.157870	1.340663	3.100000	7.500000
TEARFILL	12	6.091667	0.600694	0.360833	4.600000	6.900000

TYPE=1 YEAR=11 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	18	48.333333	3.757346	14.117647	40.000000	56.000000
BREAKFIL	18	48.000000	3.741657	14.000000	42.000000	54.000000
ELONGWAR	18	24.444444	3.147776	9.908497	20.000000	33.000000
ELONGFIL	18	29.722222	3.443759	11.859477	20.000000	33.000000
TEARWARP	18	6.952778	0.593710	0.352492	5.900000	8.400000
TEARFILL	18	6.555556	0.762521	0.581438	5.600000	8.500000

TYPE=1 YEAR=11 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	29	48.344828	3.507908	12.305419	38.000000	54.000000
BREAKFIL	29	47.172414	3.873619	15.004926	33.000000	55.000000
ELONGWAR	29	23.862069	2.850115	8.123153	16.000000	30.000000
ELONGFIL	29	29.724138	3.069394	9.421182	20.000000	33.000000
TEARWARP	29	7.010345	0.738771	0.545782	5.300000	8.400000
TEARFILL	29	6.518966	0.764784	0.584895	5.000000	8.100000

TYPE=1 YEAR=11 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	16	48.375000	4.177320	17.450000	39.000000	54.000000
BREAKFIL	16	47.312500	5.300550	28.095833	33.000000	56.000000
ELONGWAR	16	23.500000	4.098780	16.800000	13.000000	30.000000
ELONGFIL	16	30.000000	1.897367	3.600000	27.000000	33.000000
TEARWARP	16	7.206250	0.672774	0.452625	6.100000	8.400000
TEARFILL	16	6.631250	0.523729	0.274292	5.700000	7.500000

TYPE=1 YEAR=12 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	16	43.956250	3.131979	9.809292	38.300000	50.000000
BREAKFIL	16	42.043750	3.394696	11.523958	36.000000	48.000000
ELONGWAR	16	25.018750	4.482889	20.096292	16.600000	34.000000
ELONGFIL	16	30.000000	3.669696	13.466667	23.000000	36.000000
TEARWARP	16	7.031250	1.049901	1.102292	5.700000	8.800000
TEARFILL	16	7.350000	0.880152	0.774667	5.900000	9.200000

TYPE=1 YEAR=12 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	19	44.252632	2.665910	7.107076	39.000000	48.000000
BREAKFIL	19	42.710526	3.015312	9.092105	35.000000	48.000000
ELONGWAR	19	24.557895	4.313070	18.602573	16.600000	33.000000
ELONGFIL	19	30.157895	2.929982	8.584795	25.000000	36.000000
TEARWARP	19	7.094737	1.070033	1.144971	5.500000	9.000000
TEARFILL	19	7.194737	1.097205	1.203860	5.600000	9.400000

TYPE=1 YEAR=12 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	20	45.190000	2.715627	7.374632	41.000000	50.000000
BREAKFIL	20	43.725000	2.546592	6.485132	38.800000	47.000000
ELONGWAR	20	24.465000	3.657476	13.377132	20.000000	32.000000
ELONGFIL	20	30.500000	2.564946	6.578947	23.000000	33.000000
TEARWARP	20	7.425000	1.248525	1.558816	5.900000	10.800000
TEARFILL	20	7.002500	0.817003	0.667493	5.800000	8.900000

TYPE=2 YEAR=6 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	41.000000	0.0	0.0	41.000000	41.000000
BREAKFIL	1	37.000000	0.0	0.0	37.000000	37.000000
ELONGWAR	1	20.000000	0.0	0.0	20.000000	20.000000
ELONGFIL	1	30.000000	0.0	0.0	30.000000	30.000000
TEARWARP	1	6.000000	0.0	0.0	6.000000	6.000000
TEARFILL	1	7.200000	0.0	0.0	7.200000	7.200000

TYPE=2 YEAR=6 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	40.000000	0.0	0.0	40.000000	40.000000
BREAKFIL	1	40.300000	0.0	0.0	40.300000	40.300000
ELONGWAR	1	23.300000	0.0	0.0	23.300000	23.300000
ELONGFIL	1	28.900000	0.0	0.0	28.900000	28.900000
TEARWARP	1	6.400000	0.0	0.0	6.400000	6.400000
TEARFILL	1	6.400000	0.0	0.0	6.400000	6.400000

TYPE=2 YEAR=6 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	42.500000	0.0	0.0	42.500000	42.500000
BREAKFIL	1	39.000000	0.0	0.0	39.000000	39.000000
ELONGWAR	1	21.700000	0.0	0.0	21.700000	21.700000
ELONGFIL	1	30.000000	0.0	0.0	30.000000	30.000000
TEARWARP	1	7.100000	0.0	0.0	7.100000	7.100000
TEARFILL	1	6.300000	0.0	0.0	6.300000	6.300000

TYPE=2 YEAR=6 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	42.600000	0.0	0.0	42.600000	42.600000
BREAKFIL	1	36.700000	0.0	0.0	36.700000	36.700000
ELONGWAR	1	20.000000	0.0	0.0	20.000000	20.000000
ELONGFIL	1	25.500000	0.0	0.0	25.500000	25.500000
TEARWARP	1	6.000000	0.0	0.0	6.000000	6.000000
TEARFILL	1	6.800000	0.0	0.0	6.800000	6.800000

TYPE=2 YEAR=6 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	1	44.600000	0.0	0.0	44.600000	44.600000
BREAKFIL	1	39.000000	0.0	0.0	39.000000	39.000000
ELONGWAR	1	23.300000	0.0	0.0	23.300000	23.300000
ELONGFIL	1	30.000000	0.0	0.0	30.000000	30.000000
TEARWARP	1	7.400000	0.0	0.0	7.400000	7.400000
TEARFILL	1	8.100000	0.0	0.0	8.100000	8.100000

TYPE=2 YEAR=7 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	13	46.100000	3.142716	9.876667	38.000000	51.000000
BREAKFIL	13	45.846154	4.000337	16.002692	38.400000	52.500000
ELONGWAR	13	26.169231	6.183497	38.235641	16.700000	38.200000
ELONGFIL	13	24.861538	3.914830	15.325897	20.000000	31.700000
TEARWARP	13	8.076923	1.506737	2.270256	6.200000	11.300000
TEARFILL	13	7.838462	0.821116	0.674231	6.900000	9.500000

TYPE=2 YEAR=7 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	20	45.255000	2.503781	6.268921	42.500000	51.700000
BREAKFIL	20	45.480000	3.754520	14.096421	38.700000	53.300000
ELONGWAR	20	25.525000	6.522502	42.543026	15.600000	41.000000
ELONGFIL	20	25.745000	4.192785	17.579447	17.800000	35.500000
TEARWARP	20	7.970000	1.467221	2.152737	5.100000	10.800000
TEARFILL	20	8.110000	1.102581	1.215684	6.400000	10.300000

TYPE=2 YEAR=7 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	19	44.331579	4.136028	17.106725	33.000000	49.700000
BREAKFIL	19	45.400000	3.522625	12.408889	39.000000	51.200000
ELONGWAR	19	26.247368	7.016518	49.231520	15.000000	44.300000
ELONGFIL	19	25.810526	5.575830	31.089883	17.800000	35.500000
TEARWARP	19	7.821053	1.567581	2.457310	5.100000	10.100000
TEARFILL	19	7.784211	1.328852	1.765848	5.600000	10.100000

TYPE=2 YEAR=7 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	17	46.158824	2.860520	8.182574	40.200000	51.300000
BREAKFIL	17	46.070588	3.968747	15.750956	38.000000	52.700000
ELONGWAR	17	26.694118	3.856240	14.870588	21.100000	34.400000
ELONGFIL	17	26.064706	4.668638	21.796176	16.700000	33.300000
TEARWARP	17	7.717647	1.202724	1.446544	5.800000	10.500000
TEARFILL	17	8.017647	1.363926	1.860294	5.400000	10.800000

TYPE=2 YEAR=7 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	13	46.415385	4.143036	17.164744	41.500000	52.500000
BREAKFIL	13	44.169231	4.329624	18.745641	36.500000	51.500000
ELONGWAR	13	26.215385	3.917237	15.344744	21.100000	33.300000
ELONGFIL	13	27.138462	4.745794	22.522564	20.000000	35.800000
TEARWARP	13	7.846154	0.841244	0.707692	6.000000	9.200000
TEARFILL	13	8.138462	0.793241	0.629231	7.200000	9.800000

TYPE=2 YEAR=8 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	7	46.771429	3.362893	11.309048	43.000000	51.500000
BREAKFIL	7	41.885714	2.381476	5.671429	38.500000	44.700000
ELONGWAR	7	21.828571	3.781849	14.302381	18.400000	30.000000
ELONGFIL	7	24.742857	3.350053	11.222857	20.000000	28.900000
TEARWARP	7	7.328571	0.694537	0.482381	6.700000	8.500000
TEARFILL	7	7.157143	1.137039	1.292857	5.000000	8.400000

TYPE=2 YEAR=8 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	11	44.427273	5.260737	27.666182	35.700000	51.000000
BREAKFIL	11	43.281818	3.289018	10.817636	36.300000	47.000000
ELONGWAR	11	24.381818	5.047346	25.475636	16.700000	33.300000
ELONGFIL	11	24.827273	3.882033	15.070182	18.900000	30.000000
TEARWARP	11	6.818182	1.179676	1.391636	5.500000	10.000000
TEARFILL	11	7.145455	1.234798	1.524727	5.200000	9.500000

TYPE=2 YEAR=8 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	10	41.460000	5.711042	32.616000	31.000000	49.500000
BREAKFIL	10	41.520000	3.585093	12.852889	36.700000	46.000000
ELONGWAR	10	22.530000	3.964860	15.720111	18.900000	30.600000
ELONGFIL	10	24.770000	4.066134	16.533444	18.900000	30.000000
TEARWARP	10	6.730000	1.214770	1.475667	5.900000	10.000000
TEARFILL	10	7.010000	0.992696	0.985444	5.400000	9.000000

TYPE=2 YEAR=8 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	12	45.316667	3.939274	15.517879	38.300000	50.500000
BREAKFIL	12	44.833333	3.666143	13.440606	38.600000	50.300000
ELONGWAR	12	24.150000	4.283690	18.350000	16.700000	30.000000
ELONGFIL	12	26.058333	3.129467	9.793561	20.600000	31.600000
TEARWARP	12	7.091667	1.133344	1.284470	4.900000	8.500000
TEARFILL	12	7.275000	0.792149	0.627500	5.800000	8.700000

TYPE=2 YEAR=8 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	9	46.733333	3.292036	10.837500	40.500000	51.800000
BREAKFIL	9	42.944444	3.614247	13.062778	35.000000	47.300000
ELONGWAR	9	24.333333	4.069398	16.560000	16.700000	30.000000
ELONGFIL	9	25.322222	4.553509	20.734444	18.400000	31.100000
TEARWARP	9	7.211111	1.020349	1.041111	5.300000	8.500000
TEARFILL	9	7.144444	0.841295	0.707778	5.700000	8.300000

TYPE=2 YEAR=9 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	17	44.241176	4.726132	22.336324	31.600000	51.000000
BREAKFIL	17	46.070588	3.771400	14.223456	38.300000	51.000000
ELONGWAR	17	25.594118	3.411831	11.640588	18.900000	33.300000
ELONGFIL	17	28.517647	3.947980	15.586544	21.100000	34.200000
TEARWARP	17	7.658824	1.099465	1.208824	5.400000	10.000000
TEARFILL	17	7.735294	0.917838	0.842426	5.900000	10.100000

TYPE=2 YEAR=9 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	25	47.164000	3.598018	12.945733	40.300000	55.000000
BREAKFIL	25	44.460000	2.813953	7.918333	39.300000	49.300000
ELONGWAR	25	24.448000	3.277972	10.745100	18.400000	31.100000
ELONGFIL	25	29.752000	3.771728	14.225933	18.900000	34.400000
TEARWARP	25	7.648000	1.339502	1.794267	5.100000	10.800000
TEARFILL	25	7.504000	0.951963	0.906233	6.000000	10.600000

TYPE=2 YEAR=9 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	29	46.162069	3.515213	12.356724	38.700000	53.000000
BREAKFIL	29	46.124138	3.081472	9.495468	41.000000	53.000000
ELONGWAR	29	25.658621	3.919413	15.361798	15.000000	34.400000
ELONGFIL	29	29.510345	3.587612	12.870961	21.700000	34.000000
TEARWARP	29	7.393103	1.048785	1.099951	5.000000	9.500000
TEARFILL	29	7.362069	0.871130	0.758867	6.200000	9.500000

TYPE=2 YEAR=9 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	26	46.519231	3.609988	13.032015	39.000000	55.000000
BREAKFIL	26	44.653846	4.215043	17.766585	35.600000	51.500000
ELONGWAR	26	26.165385	3.256985	10.607954	18.900000	33.300000
ELONGFIL	26	28.680769	4.487050	20.133615	21.100000	35.500000
TEARWARP	26	7.111538	1.216660	1.480262	5.000000	9.700000
TEARFILL	26	7.126923	0.922847	0.851646	4.600000	8.600000

TYPE=2 YEAR=9 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	23	45.382609	4.595121	21.115138	33.000000	52.000000
BREAKFIL	23	45.539130	3.588585	12.877945	38.500000	51.300000
ELONGWAR	23	24.460870	3.796019	14.409763	16.700000	31.700000
ELONGFIL	23	28.678261	4.264116	18.182688	20.000000	35.000000
TEARWARP	23	7.869565	1.385127	1.918577	5.700000	11.700000
TEARFILL	23	7.900000	0.884205	0.781818	6.800000	10.500000

TYPE=2 YEAR=10 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	10	46.940000	2.374494	5.638222	41.500000	49.000000
BREAKFIL	10	44.540000	1.842824	3.396000	41.500000	48.000000
ELONGWAR	10	26.400000	4.610375	21.255556	22.000000	33.300000
ELONGFIL	10	27.510000	3.480246	12.112111	20.900000	32.200000
TEARWARP	10	7.330000	1.672025	2.795667	4.800000	10.500000
TEARFILL	10	7.730000	1.554956	2.417889	5.300000	9.800000

TYPE=2 YEAR=10 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	29	44.955172	3.427888	11.750419	38.700000	53.000000
BREAKFIL	29	44.993103	3.460071	11.972094	36.300000	51.300000
ELONGWAR	29	25.917241	4.264393	18.185049	17.800000	34.400000
ELONGFIL	29	27.568966	3.698562	13.679360	21.100000	32.700000
TEARWARP	29	7.051724	1.646125	2.709729	3.200000	10.500000
TEARFILL	29	7.231034	1.342467	1.802217	3.900000	11.000000

TYPE=2 YEAR=10 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	23	45.586957	2.940826	8.648458	41.000000	50.000000
BREAKFIL	23	44.613043	2.408376	5.800277	40.300000	49.000000
ELONGWAR	23	26.460870	4.575005	20.930672	20.000000	33.300000
ELONGFIL	23	28.456522	4.336717	18.807115	20.600000	36.600000
TEARWARP	23	6.865217	1.437045	2.065099	3.500000	10.700000
TEARFILL	23	7.134783	1.319645	1.741462	3.700000	9.700000

TYPE=2 YEAR=10 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	16	45.393750	3.615055	13.068625	39.300000	52.000000
BREAKFIL	16	44.143750	3.528733	12.451958	38.200000	49.000000
ELONGWAR	16	27.075000	4.433584	19.656667	20.000000	35.500000
ELONGFIL	16	27.831250	4.290255	18.406292	20.600000	36.000000
TEARWARP	16	6.868750	1.360254	1.850292	4.600000	9.400000
TEARFILL	16	7.268750	1.080567	1.167625	4.900000	9.000000

TYPE=2 YEAR=10 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	21	43.309524	4.766435	22.718905	26.500000	51.000000
BREAKFIL	21	43.947619	5.382622	28.972619	26.500000	51.500000
ELONGWAR	21	24.623810	4.509867	20.338905	17.800000	31.700000
ELONGFIL	21	27.071429	4.030774	16.247143	18.400000	35.600000
TEARWARP	21	7.614286	1.356940	1.841286	4.700000	10.100000
TEARFILL	21	7.538095	1.208502	1.460476	5.000000	9.800000

TYPE=2 YEAR=11 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	13	43.192308	4.263500	18.177436	35.300000	48.800000
BREAKFIL	13	42.607692	4.813083	23.165769	33.600000	50.500000
ELONGWAR	13	27.400000	3.777345	14.268333	20.000000	31.700000
ELONGFIL	13	24.992308	2.849111	8.117436	20.000000	30.000000
TEARWARP	13	7.784615	1.756344	3.084744	4.700000	10.700000
TEARFILL	13	7.576923	1.339872	1.795256	4.300000	9.400000

TYPE=2 YEAR=11 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	24	43.791667	3.083747	9.509493	37.000000	49.000000
BREAKFIL	24	43.095833	2.509717	6.298678	38.600000	47.000000
ELONGWAR	24	24.170833	3.681384	13.552591	17.800000	31.100000
ELONGFIL	24	28.087500	4.299374	18.484620	20.000000	35.500000
TEARWARP	24	7.058333	1.973502	3.894710	3.800000	11.200000
TEARFILL	24	7.145833	1.532823	2.349547	4.200000	10.300000

TYPE=2 YEAR=11 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	23	43.652174	2.359269	5.566245	37.300000	48.000000
BREAKFIL	23	43.900000	3.128898	9.790000	37.300000	49.300000
ELONGWAR	23	24.752174	3.998508	15.988063	16.700000	33.300000
ELONGFIL	23	26.478261	3.833341	14.694506	20.000000	33.300000
TEARWARP	23	7.234783	1.389771	1.931462	3.900000	10.400000
TEARFILL	23	6.965217	1.191488	1.419644	3.700000	9.200000

TYPE=2 YEAR=11 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	22	44.509091	3.577963	12.801818	38.500000	49.500000
BREAKFIL	22	42.254545	3.270027	10.693074	34.100000	49.000000
ELONGWAR	22	24.822727	4.188753	17.545649	19.500000	33.300000
ELONGFIL	22	27.504545	4.101739	16.824264	20.000000	33.300000
TEARWARP	22	7.336364	1.253394	1.570996	5.300000	10.200000
TEARFILL	22	7.531818	0.683399	0.467035	6.600000	9.200000

TYPE=2 YEAR=11 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	24	43.458333	2.879752	8.292971	37.000000	49.500000
BREAKFIL	24	43.400000	3.348199	11.210435	34.600000	48.500000
ELONGWAR	24	25.725000	4.613143	21.281087	18.900000	33.300000
ELONGFIL	24	27.241667	3.749541	14.059058	20.000000	34.400000
TEARWARP	24	7.325000	1.748851	3.058478	3.800000	10.800000
TEARFILL	24	7.245833	1.633375	2.669547	3.500000	9.800000

TYPE=2 YEAR=12 PANEL=1

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	12	44.775000	2.827824	7.996591	40.500000	51.000000
BREAKFIL	12	44.050000	4.599901	21.159091	33.000000	51.000000
ELONGWAR	12	25.400000	3.318269	11.010909	21.100000	31.700000
ELONGFIL	12	27.666667	4.610922	21.260606	21.700000	33.300000
TEARWARP	12	7.966667	1.172669	1.375152	6.100000	10.200000
TEARFILL	12	7.458333	0.737882	0.544470	5.900000	8.500000

TYPE=2 YEAR=12 PANEL=2

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	19	42.831579	4.355718	18.972281	35.300000	50.000000
BREAKFIL	19	41.284211	3.760506	14.141404	29.700000	46.000000
ELONGWAR	19	24.289474	3.393604	11.516550	16.700000	32.200000
ELONGFIL	19	29.221053	3.889241	15.126199	21.100000	36.600000
TEARWARP	19	7.[illegible]26316	1.543748	2.383158	4.600000	9.900000
TEARFILL	19	7.431579	1.144092	1.308947	5.200000	9.300000

TYPE=2 YEAR=12 PANEL=3

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	15	43.293333	2.783489	7.747810	38.000000	49.300000
BREAKFIL	15	42.520000	3.054552	9.330286	38.500000	46.300000
ELONGWAR	15	26.233333	4.674806	21.853810	20.000000	35.500000
ELONGFIL	15	27.720000	4.781243	22.860286	21.100000	36.600000
TEARWARP	15	7.720000	1.598750	2.556000	5.200000	9.600000
TEARFILL	15	7.520000	1.193554	1.424571	4.700000	9.600000

TYPE=2 YEAR=12 PANEL=4

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	13	42.861538	3.766196	14.184231	35.000000	47.700000
BREAKFIL	13	43.053846	3.009046	9.054359	38.000000	47.700000
ELONGWAR	13	23.992308	3.163190	10.005769	20.000000	31.100000
ELONGFIL	13	30.346154	4.023186	16.186026	22.200000	35.000000
TEARWARP	13	7.838462	1.182891	1.399231	6.000000	9.900000
TEARFILL	13	7.730769	0.719241	0.517308	6.500000	8.900000

TYPE=2 YEAR=12 PANEL=5

VARIABLE	N	MEAN	STANDARD DEV	VARIANCE	LOW	HIGH
BREAKWAR	5	41.360000	5.794221	33.573000	32.000000	48.000000
BREAKFIL	5	40.200000	3.474910	12.075000	36.000000	45.500000
ELONGWAR	5	24.760000	4.222914	17.833000	20.000000	30.000000
ELONGFIL	5	26.200000	5.188449	26.920000	21.100000	33.300000
TEARWARP	5	9.180000	1.660422	2.757000	6.600000	11.200000
TEARFILL	5	8.400000	0.992472	0.985000	7.300000	9.600000

APPENDIX F

PARACHUTE DATA

Column Coding

Column Code	Explanation
A	Sample Number
B	Parachute Type (Reserves are numbered 1 and Mains are numbered 2)
C	Parachute Serial Number
D	Break Strength, Warp Direction, Pounds
E	Break Strength, Filling, Pounds
F	Elongation, Warp, Percent
G	Elongation, Filling, Percent
H	Tear Strength, Warp, Pounds
I	Tear Strength, Filling, Pounds
J	Location Code
K	Gore Number
L	Panel Number
M	Age, Months
P	Number of Jumps
R	Suspension Line Break Strength, Pounds
S	Suspension Line, Elongation, Percent
T	Riser One, Break Strength, Pounds
U	Riser Two, Break Strength, Pounds
V	Riser One, Age, Months
W	Riser Two, Age, Months

A	B	C	D	E	F	G	H
1	1	32673	43.0	41.0	30.0	36	7.6
2	1	32673	44.0	45.0	28.0	30	9.3
3	1	32673	45.0	45.0	28.0	30	6.8
4	1	32673	41.0	42.0	28.0	30	7.7
5	1	32673	46.0	46.0	30.0	32	7.3
6	1	32673	43.0	45.0	30.0	30	8.9
7	1	277798	44.0	40.0	25.0	33	8.1
8	1	277798	42.0	39.0	25.0	33	7.2
9	1	277798	43.0	43.0	23.0	27	10.8
10	1	28555	45.0	42.0	30.0	30	6.2
11	1	28555	42.0	40.0	30.0	31	6.5
12	1	28555	45.0	42.0	26.0	30	6.2
13	1	28555	42.0	39.0	22.0	30	6.0
14	1	27802	38.3	42.0	27.0	30	7.5
15	1	27802	42.5	42.0	30.0	33	5.5
16	1	27802	42.0	40.5	32.0	32	5.9
17	1	28502	42.0	38.0	27.0	25	5.8
18	1	28502	44.0	43.0	27.0	27	5.6
19	1	28502	45.0	43.0	28.0	23	6.5
20	1	28502	43.0	46.0	30.0	26	5.9
21	1	28502	43.0	44.0	25.0	25	6.0
22	1	28564	50.0	46.0	23.0	32	7.3
23	1	28564	49.0	44.0	23.3	33	7.0
24	1	28564	45.0	41.0	20.0	30	7.2
25	1	28599	40.8	40.0	20.0	36	8.8
26	1	28599	39.5	42.0	20.0	33	9.0
27	1	28507	39.0	36.0	21.7	28	6.5
28	1	28507	39.0	35.0	25.0	30	8.1
29	1	28507	46.0	40.2	23.0	30	7.9
30	1	27803	50.0	47.0	23.0	30	6.6
31	1	27803	48.0	44.0	23.0	30	6.3
32	1	27803	45.0	46.0	23.0	30	6.6
33	1	28598	47.0	45.0	34.0	30	8.8
34	1	28598	46.0	46.0	23.0	30	8.6
35	1	28598	48.0	45.0	23.0	30	7.6
36	1	28542	45.2	38.7	23.0	33	5.7
37	1	28542	44.8	38.5	23.0	33	6.7
38	1	28542	42.8	38.8	23.0	33	5.9
39	1	28602	48.0	45.0	23.0	36	8.9
40	1	28602	46.0	48.0	25.0	33	8.1
41	1	28602	48.0	47.0	20.0	33	9.1
42	1	68039	49.0	49.0	23.0	30	7.0
43	1	68039	48.0	52.0	23.0	27	6.8
44	1	68039	50.0	50.0	23.0	27	8.1
45	1	68039	51.0	46.0	23.0	30	5.3
46	1	48528	55.0	50.0	23.0	30	7.4
47	1	48528	53.0	46.0	21.0	30	6.5
48	1	48528	52.0	50.0	20.0	30	7.7

A	I	J	K	L	M	P
1	7.00	1	24	1	135	0
2	7.60	1	24	3	135	0
3	6.00	1	17	2	135	0
4	7.45	1	17	3	135	0
5	7.80	1	8	2	135	0
6	7.70	1	8	3	135	0
7	8.20	1	2	1	136	0
8	8.20	1	13	2	136	0
9	8.90	1	19	3	136	0
10	7.60	1	5	2	135	0
11	6.10	1	21	3	135	0
12	8.20	1	9	1	135	0
13	7.60	1	15	1	135	0
14	5.90	1	22	1	135	0
15	5.80	1	22	2	135	0
16	5.80	1	22	3	135	0
17	6.70	1	10	1	135	0
18	5.90	1	10	2	135	0
19	6.50	1	5	1	135	0
20	7.30	1	6	1	135	0
21	7.60	1	8	2	135	0
22	7.00	1	4	3	135	0
23	7.20	1	17	3	135	0
24	7.20	1	24	3	135	0
25	9.20	1	24	1	135	0
26	9.40	1	24	2	135	0
27	7.30	1	12	1	135	0
28	7.70	1	12	2	135	0
29	8.10	1	12	3	135	0
30	7.20	1	4	1	136	0
31	7.10	1	4	2	136	0
32	7.40	1	4	3	136	0
33	8.00	1	7	1	135	0
34	8.40	1	7	2	135	0
35	7.40	1	7	3	135	0
36	6.80	1	16	1	135	0
37	6.60	1	16	2	135	0
38	6.40	1	16	3	135	0
39	8.90	1	1	2	135	0
40	7.50	1	15	2	135	0
41	7.80	1	20	3	135	0
42	6.90	1	14	1	123	0
43	6.50	1	15	1	123	0
44	6.80	1	14	2	123	0
45	7.80	1	15	2	123	0
46	7.40	1	5	1	123	0
47	8.10	1	5	2	123	0
48	6.60	1	5	3	123	0

A	B	C	D	E	F	G	H	I
49	1	3235	42	40	17.0	23	6.0	7.30
50	1	3235	40	40	17.0	27	5.3	6.40
51	1	74541	50	50	23.0	20	7.1	7.10
52	1	50567	48	48	20.0	30	7.9	7.90
53	1	50567	49	47	21.0	27	7.9	6.50
54	1	53607	51	48	21.0	30	4.8	6.10
55	1	53607	50	48	20.0	27	7.5	4.90
56	1	53607	51	50	23.0	33	5.6	6.70
57	1	50701	47	47	20.0	30	7.0	5.70
58	1	50701	43	44	23.0	33	6.9	5.80
59	1	50701	47	45	23.0	30	7.0	4.90
60	1	74395	48	47	23.0	30	8.2	6.60
61	1	74395	49	44	23.0	30	6.8	5.90
62	1	13411	52	51	23.0	30	7.0	7.70
63	1	13411	52	51	20.0	33	8.0	6.20
64	1	13411	53	51	23.0	30	6.5	7.50
65	1	13411	54	48	20.0	30	7.6	7.50
66	1	13411	51	50	23.0	30	7.7	7.40
67	1	13411	51	51	23.0	30	7.2	7.00
68	1	27383	52	49	18.0	23	8.9	8.20
69	1	27383	49	50	17.0	27	8.4	7.50
70	1	27383	52	51	20.0	23	8.2	7.10
71	1	41316	49	45	13.0	23	6.9	7.70
72	1	41316	47	39	13.0	17	6.3	7.70
73	1	25299	52	48	23.0	30	8.7	6.90
74	1	54716	53	50	20.0	30	6.0	5.90
75	1	54716	51	49	23.0	33	6.0	5.60
76	1	74199	49	49	23.0	30	6.4	8.60
77	1	57799	40	42	16.0	23	7.6	6.70
78	1	57799	43	42	17.0	23	7.2	5.90
79	1	54686	47	43	20.0	27	6.1	6.20
80	1	74453	49	46	23.0	33	7.3	6.25
81	1	74453	48	49	23.0	30	6.9	6.40
82	1	74453	49	51	27.0	30	7.5	6.30
83	1	29715	47	43	20.0	30	6.5	6.20
84	1	26443	47	46	27.0	30	6.8	6.70
85	1	26443	48	45	23.0	33	7.3	6.70
86	1	26443	48	46	27.0	33	6.8	6.20
87	1	27617	48	48	27.0	33	6.9	6.00
88	1	29897	44	43	20.0	27	6.6	5.60
89	1	24740	40	41	16.6	27	6.4	6.30
90	1	29691	44	42	20.0	23	5.2	6.20
91	1	29691	42	46	20.0	27	6.8	5.90
92	1	20334	46	46	23.0	33	6.9	6.30
93	1	31757	46	44	33.0	27	7.1	6.50
94	1	30224	46	44	16.6	27	7.4	8.20
95	1	26870	45	41	20.0	27	7.9	7.60
96	1	24378	45	43	20.0	30	8.2	7.50

A	J	K	L	M	P
49	1	11	1	115	0
50	1	11	2	115	0
51	1	18	2	119	0
52	1	12	1	115	0
53	1	12	2	115	0
54	1	6	1	115	0
55	1	6	2	115	0
56	1	6	3	115	0
57	1	3	3	115	0
58	1	15	1	115	0
59	1	21	2	115	0
60	1	11	1	119	0
61	1	11	2	119	0
62	1	17	1	104	0
63	1	17	2	104	0
64	1	18	1	104	0
65	1	18	2	104	0
66	1	19	1	104	0
67	1	19	2	104	0
68	1	24	1	97	0
69	1	24	2	97	0
70	1	24	3	97	0
71	1	18	1	82	0
72	1	18	2	82	0
73	1	17	2	75	0
74	2	17	1	111	0
75	2	17	2	111	0
76	2	10	2	114	0
77	2	13	1	114	0
78	2	13	2	114	0
79	2	6	3	112	0
80	2	24	1	119	0
81	2	24	2	119	0
82	2	24	3	119	0
83	3	12	2	137	0
84	3	16	3	137	0
85	3	17	3	137	0
86	3	18	3	137	0
87	3	16	1	136	0
88	3	11	2	137	0
89	3	22	2	138	0
90	3	10	3	137	0
91	3	11	3	137	0
92	3	8	3	137	0
93	3	5	2	136	0
94	3	6	1	136	0
95	3	13	2	137	0
96	3	23	1	139	0

A	B	C	D	E	F	G	H	I
97	1	43631	40	50	33	20	6.80	7.70
98	1	43631	45	51	27	23	7.30	7.90
99	1	53905	51	52	30	20	6.30	6.10
100	1	57656	50	42	27	16	6.80	7.20
101	1	1413	40	45	27	23	6.40	6.90
102	1	2478	44	42	23	27	7.30	7.10
103	1	57767	46	41	23	27	5.70	5.30
104	1	1660	42	42	23	20	7.30	6.50
105	1	61927	50	48	27	30	6.90	6.10
106	1	40494	50	50	20	30	8.90	9.90
107	1	40557	48	43	27	30	7.40	6.00
108	1	54968	46	51	30	20	9.60	10.80
109	1	54968	52	48	20	30	8.80	9.10
110	1	55011	49	51	23	30	7.70	8.40
111	1	53340	50	45	30	20	7.90	8.80
112	1	48773	51	48	27	30	8.40	7.50
113	1	48655	56	54	20	30	5.90	5.60
114	1	48655	47	48	23	20	6.00	5.75
115	1	48747	52	48	27	30	6.70	6.40
116	1	48565	44	45	27	30	6.60	5.80
117	1	48585	50	47	23	30	6.10	6.00
118	1	48392	48	48	20	27	5.70	5.00
119	1	48783	47	42	23	30	5.90	5.70
120	1	48763	46	45	23	33	7.00	5.10
121	1	48785	54	50	23	33	6.40	6.20
122	1	48785	52	49	23	33	6.30	5.70
123	1	48394	50	48	27	30	6.70	6.35
124	1	48582	52	53	23	33	6.70	5.90
125	1	48654	50	51	23	33	7.30	6.60
126	1	48654	49	49	23	30	7.60	7.50
127	1	48658	52	52	20	30	6.95	5.75
128	1	48658	49	48	27	30	7.20	7.20
129	1	48653	49	50	23	30	7.30	6.50
130	1	52578	46	48	20	30	6.30	5.60
131	1	52966	43	25	23	17	3.10	4.60
132	1	52995	46	43	23	23	6.55	6.40
133	1	62376	51	43	23	27	7.90	6.70
134	1	62353	50	49	27	30	7.70	8.00
135	1	62353	49	49	23	30	9.30	8.20
136	1	23239	55	54	27	33	6.60	6.10
137	1	26827	47	49	23	30	7.40	8.45
138	1	26827	50	50	20	27	6.20	8.30
139	1	26827	50	48	20	30	6.50	8.00
140	1	26747	45	48	30	23	6.90	8.50
141	1	26780	49	46	23	30	6.90	7.10
142	1	27025	51	53	23	27	6.85	7.50
143	1	27060	50	53	20	30	7.30	7.00
144	1	27029	44	45	23	30	6.40	6.65

A	J	K	L	M	P
97	3	19	1	130	0
98	3	19	2	130	0
99	3	12	3	112	0
100	3	1	1	114	0
101	3	4	3	117	0
102	3	2	2	116	0
103	3	24	1	114	0
104	3	1	3	117	0
105	3	3	3	108	0
106	3	9	2	82	0
107	3	13	2	82	0
108	3	24	1	74	0
109	3	24	2	74	0
110	3	23	2	73	0
111	3	7	2	72	0
112	4	18	3	127	0
113	4	2	1	127	0
114	4	2	2	127	0
115	4	23	2	127	0
116	4	10	1	127	0
117	4	10	2	127	0
118	4	3	2	127	0
119	4	14	1	127	0
120	4	14	2	127	0
121	4	12	2	127	0
122	4	12	3	127	0
123	4	5	2	127	0
124	4	24	1	127	0
125	4	24	1	127	0
126	4	24	2	127	0
127	4	12	2	127	0
128	4	12	3	127	0
129	4	4	3	127	0
130	4	1	1	113	0
131	4	7	3	112	0
132	4	8	3	112	0
133	4	19	3	107	0
134	4	18	1	107	0
135	4	18	2	107	0
136	4	6	3	107	0
137	4	3	1	97	0
138	4	3	2	97	0
139	4	3	3	97	0
140	4	15	2	97	0
141	4	9	2	97	0
142	4	6	1	97	0
143	4	14	2	97	0
144	4	5	3	97	0

A	B	C	D	E	F	G	H	I	J
145	1	3355	40.0	40	20	26	6.50	5.6	5
146	1	3355	42.0	40	20	23	6.70	6.0	5
147	1	3113	41.0	41	20	23	6.40	5.0	5
148	1	3113	43.0	40	20	23	6.00	4.7	5
149	1	2022	42.0	41	20	26	5.30	4.5	5
150	1	2022	40.0	39	20	26	5.30	4.3	5
151	1	40019	49.0	49	27	30	7.50	6.4	6
152	1	40019	46.0	48	23	33	7.90	7.6	6
153	1	40019	50.0	54	30	30	8.20	7.1	6
154	1	47514	47.0	45	23	30	6.30	6.5	6
155	1	47514	47.0	46	23	30	6.10	6.4	6
156	1	39647	46.0	42	23	30	6.50	6.8	6
157	1	39647	45.0	46	27	33	7.40	6.2	6
158	1	38839	38.0	33	16	27	7.30	6.7	6
159	1	38839	39.0	33	20	27	6.70	5.8	6
160	1	48855	50.0	47	27	33	7.70	6.7	6
161	1	48855	51.0	42	27	30	7.50	6.8	6
162	1	40132	49.0	48	30	33	7.30	5.9	6
163	1	40132	50.0	48	23	30	7.00	5.8	6
164	1	39834	48.0	44	23	30	7.10	6.5	6
165	1	39834	50.0	49	23	33	6.95	6.7	6
166	1	39834	49.0	48	23	30	7.50	6.9	6
167	1	40022	50.0	51	27	33	7.10	6.6	6
168	1	40022	47.0	47	27	33	7.20	7.0	6
169	1	48854	48.0	45	23	30	6.50	6.4	6
170	1	48854	46.0	44	23	30	7.30	6.7	6
171	1	40136	46.0	45	23	30	7.30	6.9	6
172	1	39797	42.0	43	27	30	6.40	6.7	6
173	1	39797	39.0	42	13	27	6.90	7.2	6
174	1	59815	48.0	43	20	20	6.70	6.4	6
175	1	59815	44.0	40	20	20	7.20	6.1	6
176	1	67638	44.0	43	23	30	8.40	8.5	6
177	1	67638	45.0	42	23	27	7.90	6.9	6
178	1	74097	47.0	47	30	30	6.80	6.2	6
179	1	74097	48.0	47	20	30	6.40	5.9	6
180	1	74085	51.0	55	23	27	7.10	6.0	6
181	1	74085	50.0	48	27	27	6.70	6.5	6
182	1	74058	47.0	47	23	23	6.90	5.8	6
183	1	74058	48.0	46	24	30	8.00	6.5	6
184	1	74288	54.0	52	23	30	7.30	5.7	6
185	1	74288	54.0	56	23	33	7.10	6.8	6
186	1	35176	62.0	51	23	24	7.30	6.3	6
187	1	35176	51.0	53	27	30	6.40	6.1	6
188	1	35259	49.0	53	27	30	7.10	7.0	6
189	1	35259	44.0	51	17	30	6.30	6.0	6
190	1	35687	50.0	50	23	30	6.10	5.7	6
191	1	35687	46.0	48	27	30	6.40	6.1	6
192	1	35687	46.0	47	30	30	6.50	6.5	6

A	K	L	M	P
145	10	3	115	0
146	11	3	115	0
147	2	2	116	0
148	3	2	116	0
149	12	1	117	0
150	12	2	117	0
151	16	1	132	0
152	16	2	132	0
153	16	3	132	0
154	2	2	128	0
155	2	3	128	0
156	10	1	132	0
157	10	2	132	0
158	13	2	132	0
159	13	3	132	0
160	8	2	127	0
161	8	3	127	0
162	9	1	131	0
163	9	2	131	0
164	24	1	132	0
165	24	2	132	0
166	24	3	132	0
167	24	1	132	0
168	24	2	132	0
169	11	1	127	0
170	11	2	127	0
171	3	3	132	0
172	19	2	132	0
173	19	3	132	0
174	3	2	111	0
175	3	3	111	0
176	5	1	122	0
177	5	2	122	0
178	20	2	121	0
179	20	3	121	0
180	5	2	121	0
181	5	3	121	0
182	24	1	121	0
183	24	2	121	0
184	4	2	121	0
185	4	3	121	0
186	4	1	95	0
187	4	2	95	0
188	24	1	94	0
189	24	2	94	0
190	7	1	94	0
191	7	2	94	0
192	7	3	94	0

A	B	C	D	E	F	G	H	I	J
193	1	35267	46.0	47.0	24.0	33.0	7.00	6.0	6
194	1	35267	51.0	51.0	27.0	33.0	6.50	5.8	6
195	1	34921	50.0	49.0	27.0	33.0	7.20	6.1	6
196	1	35587	49.0	49.0	27.0	33.0	6.50	5.8	6
197	1	35587	51.0	46.0	27.0	33.0	6.90	6.5	6
198	1	34921	50.0	54.0	20.0	30.0	7.00	6.1	6
199	1	39995	48.0	49.0	23.0	33.0	7.45	7.0	6
200	1	39995	47.0	48.0	27.0	33.0	8.40	6.5	6
201	1	39995	48.0	51.0	27.0	33.0	8.00	6.3	6
202	2	50892	45.0	46.0	20.0	28.0	7.40	7.7	3
203	2	50892	48.5	48.0	25.0	29.0	6.60	7.5	3
204	2	50892	51.0	50.0	26.0	29.0	8.00	7.5	3
205	2	50892	55.0	48.0	26.0	33.0	6.80	7.8	3
206	2	50892	55.0	45.0	23.0	33.0	7.20	8.1	3
207	2	25684	44.0	48.0	20.0	31.0	7.30	7.5	3
208	2	25684	53.0	47.0	27.0	31.0	8.10	7.0	3
209	2	25684	52.0	51.0	23.0	34.0	9.20	10.5	3
210	2	25684	52.0	49.0	27.0	31.0	7.00	6.7	3
211	2	25684	53.0	53.0	27.0	34.0	7.50	6.8	3
212	2	8749	51.0	48.0	23.0	32.0	4.80	5.7	3
213	2	8749	50.0	48.0	28.0	30.0	5.50	6.2	3
214	2	8749	51.0	51.5	23.0	31.5	6.80	8.6	3
215	2	8749	53.0	49.0	25.0	31.5	7.50	5.7	3
216	2	8749	52.0	49.0	23.0	36.0	5.30	6.0	3
217	2	8035	42.0	40.7	17.8	25.5	6.60	7.1	3
218	2	8035	43.3	38.3	18.9	21.1	6.40	6.9	3
219	2	8035	42.6	42.3	20.0	26.6	6.90	7.5	3
220	2	8035	43.3	42.0	20.0	27.7	7.30	8.2	3
221	2	8035	47.3	42.6	20.0	24.4	7.10	7.5	3
222	2	22689	41.6	39.0	21.1	26.6	7.00	7.7	3
223	2	22689	35.3	33.6	20.0	24.4	6.60	7.0	3
224	2	22689	41.6	39.6	18.9	27.7	6.50	6.4	3
225	2	22689	42.3	39.3	20.0	26.6	4.90	4.8	3
226	2	22689	39.0	38.6	18.9	27.7	6.60	6.7	3
227	2	21464	40.3	39.3	30.0	26.6	9.70	9.1	3
228	2	21464	40.3	43.0	21.1	28.3	7.40	9.4	3
229	2	21464	42.3	41.6	23.9	27.5	9.10	9.0	3
230	2	21464	42.0	34.1	20.0	24.4	8.40	7.4	3
231	2	21464	43.0	41.0	23.3	27.7	7.70	7.9	3
232	2	56515	40.0	41.0	24.4	28.8	5.30	6.0	3
233	2	56515	42.0	42.0	22.2	30.0	7.50	8.0	3
234	2	56515	45.3	39.0	28.8	23.3	6.20	8.7	3
235	2	56515	45.3	34.6	23.3	25.5	8.60	8.0	3
236	2	56515	46.6	45.0	24.4	28.8	6.40	7.6	3
237	2	48640	45.6	44.6	25.5	30.0	6.60	7.6	3
238	2	48640	45.0	42.6	24.4	31.1	6.60	7.5	3
239	2	48640	44.6	42.6	23.6	29.9	6.30	6.9	3
240	2	48640	46.6	42.0	24.4	30.0	7.10	7.6	3

A	K	L	M	P	R	S	T	U	V	W
193	1	1	94	0	0	0.0	0	0	0	
194	1	2	94	0	0	0.0	0	0	0	
195	9	2	95	0	0	0.0	0	0	0	
196	14	2	94	0	0	0.0	0	0	0	
197	14	3	94	0	0	0.0	0	0	0	
198	9	3	95	0	0	0.0	0	0	0	
199	17	1	132	0	0	0.0	0	0	0	
200	17	2	132	0	0	0.0	0	0	0	
201	17	3	132	0	0	0.0	0	0	0	
202	5	2	103	88	245	21.9	5600	5600	109	109
203	7	3	103	88	240	22.5	0	0	0	0
204	21	1	103	88	250	22.5	0	0	0	0
205	26	4	103	88	250	23.0	0	0	0	0
206	29	2	103	88	255	23.0	0	0	0	0
207	1	1	97	28	415	30.7	5750	5790	143	143
208	6	3	97	28	380	28.5	0	0	0	0
209	10	5	97	28	400	28.8	0	0	0	0
210	18	2	97	28	390	30.1	0	0	0	0
211	21	3	97	28	390	28.8	0	0	0	0
212	6	2	109	82	350	31.5	5640	5720	48	48
213	12	3	109	82	340	30.1	0	0	0	0
214	13	5	109	82	345	30.1	0	0	0	0
215	25	2	109	82	340	31.5	0	0	0	0
216	29	4	109	82	340	31.5	0	0	0	0
217	5	2	109	82	380	30.1	5620	0	107	0
218	7	2	109	82	370	30.1	0	0	0	0
219	13	4	109	82	365	30.1	0	0	0	0
220	21	5	109	82	355	30.1	0	0	0	0
221	22	3	109	82	380	31.5	0	0	0	0
222	11	3	122	99	340	26.0	6150	5900	0	0
223	15	1	122	99	305	23.3	0	0	0	0
224	17	5	122	99	310	24.7	0	0	0	0
225	28	2	122	99	315	26.0	0	0	0	0
226	30	2	122	99	325	24.7	0	0	0	0
227	4	1	123	89	385	27.4	5000	6120	0	0
228	8	5	123	89	395	28.8	0	0	0	0
229	11	2	123	89	390	28.8	0	0	0	0
230	17	4	123	89	320	26.0	0	0	0	0
231	30	3	123	89	330	26.0	0	0	0	0
232	2	2	132		215	17.8	6120	5600	93	96
233	4	3	132		250	20.5	0	0	0	0
234	6	1	132		210	17.8	0	0	0	0
235	12	5	132		235	20.5	0	0	0	0
236	18	1	132		240	21.9	0	0	0	0
237	3	1	125	41	300	26.0	5680	5640	93	93
238	5	2	125	41	315	26.0	0	0	0	0
239	9	3	125	41	265	21.9	0	0	0	0
240	14	4	125	41	345	27.4	0	0	0	0

A	B	C	D	E	F	G	H	I	J
241	2	48640	44.6	44.0	24.5	30.0	7.8	7.5	3
242	2	36535	41.0	37.0	20.0	30.0	6.0	7.2	3
243	2	36535	40.0	40.3	23.3	28.9	6.4	6.4	3
244	2	36535	42.6	36.7	20.0	25.5	6.0	6.8	3
245	2	36535	42.5	39.0	21.7	30.0	7.1	6.3	3
246	2	36535	44.6	39.0	23.3	30.0	7.4	8.1	3
247	2	37874	41.0	33.0	22.2	26.6	8.7	6.8	3
248	2	37874	43.3	41.3	25.5	26.6	9.5	7.2	3
249	2	37874	42.0	41.0	22.2	21.1	9.1	8.3	3
250	2	37874	46.6	43.0	22.2	28.9	8.2	8.2	3
251	2	37874	46.6	42.3	23.3	30.0	9.9	7.9	3
252	2	32318	48.3	49.6	24.4	31.1	7.5	7.2	3
253	2	32318	44.6	47.0	23.3	32.2	7.5	6.7	3
254	2	32318	48.6	46.0	22.2	30.0	8.7	8.1	3
255	2	32318	44.0	35.6	23.3	22.0	8.0	7.6	3
256	2	32318	48.3	42.3	23.3	30.0	6.8	7.9	3
257	2	9740	39.3	45.0	18.9	28.9	5.5	6.4	3
258	2	9740	46.3	42.0	20.0	26.6	6.9	7.6	3
259	2	9740	42.3	43.3	22.0	27.7	6.0	6.4	3
260	2	9740	45.0	41.3	28.4	28.8	6.1	6.5	3
261	2	9740	45.3	42.6	23.3	29.9	5.3	5.7	3
262	2	7170	39.0	43.0	23.3	33.3	7.8	8.0	3
263	2	7170	48.6	46.3	28.8	31.1	7.3	7.0	3
264	2	7170	31.6	41.0	25.5	33.3	8.4	8.1	3
265	2	7170	44.3	40.6	24.4	32.2	6.5	6.5	3
266	2	7170	45.7	41.0	24.4	30.0	8.5	7.7	3
267	2	64357	38.0	36.7	20.0	22.0	6.3	7.2	3
268	2	64357	38.3	38.6	17.8	25.5	6.8	7.5	3
269	2	64357	48.3	41.3	21.1	25.5	7.0	7.3	3
270	2	64357	48.6	43.6	21.1	27.7	6.1	7.3	3
271	2	64357	44.5	39.3	21.7	24.4	6.7	7.3	3
272	2	36482	46.6	43.6	23.3	28.7	6.0	6.5	3
273	2	36482	43.3	43.3	27.8	25.5	6.3	6.7	3
274	2	36482	42.3	46.0	28.9	22.2	7.5	5.9	3
275	2	36482	40.6	39.3	31.1	21.1	6.1	6.8	3
276	2	36482	43.0	42.3	22.0	30.0	6.0	6.6	3
277	2	66985	51.0	46.3	25.5	30.0	8.3	7.7	3
278	2	66985	49.3	46.3	25.5	28.9	9.3	7.7	3
279	2	66985	50.0	41.0	23.3	28.9	9.0	7.3	3
280	2	66985	45.0	43.3	21.1	24.4	9.4	7.8	3
281	2	66985	42.3	39.0	20.0	23.3	11.2	9.6	3
282	2	16922	39.7	40.3	18.9	26.6	4.5	4.3	3
283	2	16922	45.7	41.3	24.4	28.8	3.8	4.4	3
284	2	16922	44.0	45.0	27.7	28.9	3.9	4.0	3
285	2	16922	43.3	40.0	23.3	28.8	5.2	3.5	3
286	2	16922	45.0	43.0	26.6	30.0	4.8	6.6	3
287	2	35283	41.0	42.0	20.0	25.5	7.2	8.0	3
288	2	35283	41.3	42.6	20.0	26.6	8.0	8.6	3

A	K	L	M	P	R	S	T	U	V	W
241	28	5	125	41	335	27.4	0	0	0	0
242	1	1	70	100	290	23.3	6020	5800	100	100
243	4	2	70	100	310	24.7	0	0	0	0
244	4	4	70	100	310	26.0	0	0	0	0
245	22	3	70	100	300	24.7	0	0	0	0
246	26	5	70	100	320	26.0	0	0	0	0
247	3	1	140	32	310	23.3	5620	5990	104	76
248	11	3	140	32	315	24.7	0	0	0	0
249	17	5	140	32	300	24.7	0	0	0	0
250	22	2	140	32	350	27.4	0	0	0	0
251	26	4	140	32	295	23.3	0	0	0	0
252	2	3	101	1	400	32.9	6490	6280	101	101
253	5	1	101	1	400	32.9	0	0	0	0
254	8	2	101	1	405	32.9	0	0	0	0
255	14	4	101	1	385	31.5	0	0	0	0
256	21	5	101	1	390	31.5	0	0	0	0
257	5	2	95	82	250	23.3	5670	5700	96	96
258	18	1	95	82	305	23.3	0	0	0	0
259	13	3	95	82	360	28.8	0	0	0	0
260	19	4	95	82	310	24.7	0	0	0	0
261	24	5	95	82	270	24.7	0	0	0	0
262	1	5	100		0	0.0	0	0	0	0
263	5	4	100		0	0.0	0	0	0	0
264	21	1	100		0	0.0	0	0	0	0
265	25	2	100		0	0.0	0	0	0	0
266	25	3	100		0	0.0	0	0	0	0
267	9	3	88		0	0.0	0	0	0	0
268	15	4	88		0	0.0	0	0	0	0
269	19	5	88		0	0.0	0	0	0	0
270	21	2	88		0	0.0	0	0	0	0
271	24	1	88		0	0.0	0	0	0	0
272	3	4	142		330	27.4	5650	5740	0	0
273	13	2	142		320	27.4	0	0	0	0
274	5	1	142		330	27.4	0	0	0	0
275	17	3	142		315	27.4	0	0	0	0
276	28	2	142		330	27.4	0	0	0	0
277	4	1	144		410	28.8	5740	5860	24	24
278	4	3	144		425	30.1	0	0	0	0
279	19	2	144		420	30.1	0	0	0	0
280	20	1	144		410	30.1	0	0	0	0
281	30	5	144		420	31.5	0	0	0	0
282	1	2	123		340	27.4	5720	5650	0	0
283	20	5	123		320	24.7	0	0	0	0
284	21	5	123		330	26.0	0	0	0	0
285	28	5	123		335	27.4	0	0	0	0
286	29	5	123		340	26.0	0	0	0	0
287	13	3	117		350	26.0	4530	5690	0	0
288	19	5	117		325	26.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
289	2	35283	45.00	44.3	17.80	28.8	8.5	8.2	3	20
290	2	35283	47.60	46.0	22.00	30.0	7.7	8.4	3	22
291	2	35283	47.60	47.0	23.30	30.0	9.3	8.9	3	29
292	2	81466	48.00	42.6	22.20	27.7	5.3	6.6	3	9
293	2	81466	41.10	43.6	20.00	26.6	3.2	3.9	3	9
294	2	81466	48.00	43.6	25.50	27.7	3.5	3.7	3	9
295	2	81466	46.30	46.3	22.20	27.7	4.4	6.2	3	20
296	2	81466	43.30	48.0	20.00	28.9	4.7	5.0	3	20
297	2	8586	49.00	45.0	26.60	30.0	7.0	8.4	3	7
298	2	8586	49.00	46.0	22.20	28.8	8.8	8.0	3	8
299	2	8586	46.30	45.0	22.20	27.7	10.5	9.8	3	14
300	2	8586	46.00	45.0	24.40	28.8	10.5	10.2	3	14
301	2	8586	43.30	45.3	27.70	21.1	7.9	7.9	3	16
302	2	426	45.70	49.0	23.30	26.6	7.2	7.6	3	2
303	2	426	50.00	47.0	23.30	28.9	6.6	6.2	3	2
304	2	426	50.30	51.3	24.40	31.1	8.7	7.8	3	2
305	2	426	50.70	47.0	26.60	31.1	7.5	7.3	3	28
306	2	426	51.00	48.0	24.40	32.2	7.3	6.4	3	28
307	2	18895	49.00	45.7	23.30	30.0	8.0	8.1	3	1
308	2	18895	43.00	41.3	21.10	28.9	10.2	9.2	3	1
309	2	18895	44.70	42.7	28.90	20.0	10.4	9.2	3	8
310	2	18895	45.70	43.7	22.20	28.9	10.8	9.8	3	8
311	2	18895	42.30	41.7	21.10	27.7	7.9	7.6	3	8
312	2	83550	48.70	43.7	23.30	30.0	6.6	7.7	3	4
313	2	83550	47.00	42.7	22.20	30.0	5.6	7.4	3	4
314	2	83590	47.30	41.7	22.20	30.0	6.1	6.7	3	5
315	2	83550	48.30	45.0	23.30	31.1	5.9	6.5	3	6
316	2	83550	46.70	42.3	22.20	30.0	6.4	7.9	3	7
317	2	66007	46.00	46.0	20.00	28.3	6.9	7.3	3	9
318	2	66007	47.00	46.0	26.60	31.1	7.0	7.7	3	9
319	2	66007	47.00	50.3	26.60	30.0	6.9	7.8	3	13
320	2	66007	49.30	44.7	21.10	28.9	8.0	8.4	3	16
321	2	66007	47.30	46.7	25.50	30.0	7.5	7.6	3	16
322	2	71352	48.70	43.0	22.20	28.9	7.3	7.8	3	5
323	2	71352	49.00	43.4	23.30	30.0	7.1	6.7	3	12
324	2	71352	49.00	42.4	25.50	33.3	8.8	7.6	3	28
325	2	71352	47.70	38.4	26.60	31.1	6.2	6.9	3	12
326	2	71352	44.00	40.7	21.10	32.2	8.2	0.0	3	30
327	2	6463	48.00	42.7	26.60	30.0	5.7	7.2	3	12
328	2	6463	46.30	45.0	27.70	31.1	10.7	9.7	3	12
329	2	6463	44.30	44.3	23.30	32.2	8.4	9.7	3	13
330	2	6463	47.30	44.0	26.60	28.9	9.4	8.7	3	16
331	2	6463	43.00	42.0	24.40	28.9	8.0	9.8	3	16
332	2	22074	37.00	41.7	17.80	31.1	7.8	7.6	3	14
333	2	22074	37.30	40.0	18.90	23.3	8.2	7.3	3	14
334	2	22074	42.30	42.7	21.10	31.1	5.4	6.6	3	19
335	2	22074	39.70	38.7	20.00	30.0	6.7	5.6	3	19
336	2	22074	39.00	40.7	20.00	31.1	6.3	6.7	3	27

A	L	M	P	R	S	T	U	V	W
289	5	117		320	24.7	0	0	0	0
290	1	117		345	26.0	0	0	0	0
291	2	117		330	24.7	0	0	0	0
292	1	111		335	28.8	5630	5780	99	99
293	2	111		350	31.5	0	0	0	0
294	3	111		350	30.1	0	0	0	0
295	2	111		335	30.1	0	0	0	0
296	5	111		290	28.8	0	0	0	0
297	4	109		360	28.8	5880	5760	0	0
298	5	109		340	27.4	0	0	0	0
299	1	109		345	28.8	0	0	0	0
300	2	109		345	27.4	0	0	0	0
301	2	109		360	28.8	0	0	0	0
302	1	99		0	0.0	0	0	0	0
303	3	99		0	0.0	0	0	0	0
304	5	99		0	0.0	0	0	0	0
305	2	99		0	0.0	0	0	0	0
306	4	99		0	0.0	0	0	0	0
307	2	125		0	0.0	0	0	0	0
308	4	125		0	0.0	0	0	0	0
309	3	125		0	0.0	0	0	0	0
310	5	125		0	0.0	0	0	0	0
311	1	125		0	0.0	0	0	0	0
312	1	116		0	0.0	0	0	0	0
313	5	116		0	0.0	0	0	0	0
314	2	116		0	0.0	0	0	0	0
315	3	116		0	0.0	0	0	0	0
316	3	116		0	0.0	0	0	0	0
317	3	87		0	0.0	0	0	0	0
318	5	87		0	0.0	0	0	0	0
319	4	87		0	0.0	0	0	0	0
320	1	87		0	0.0	0	0	0	0
321	2	87		0	0.0	0	0	0	0
322	1	81		0	0.0	0	0	0	0
323	2	81		0	0.0	0	0	0	0
324	3	81		0	0.0	0	0	0	0
325	1	81		0	0.0	0	0	0	0
326	5	81		0	0.0	0	0	0	0
327	2	113		0	0.0	0	0	0	0
328	3	113		0	0.0	0	0	0	0
329	1	113		0	0.0	0	0	0	0
330	4	113		0	0.0	0	0	0	0
331	5	113		0	0.0	0	0	0	0
332	2	122	13	370	27.4	5900	5860	120	120
333	3	122	13	375	27.4	0	0	0	0
334	4	122	13	380	27.4	0	0	0	0
335	5	122	13	365	27.4	0	0	0	0
336	4	122	13	375	28.8	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
337	2	75276	46.30	36.7	25.50	26.6	10.7	8.6	3	15
338	2	75276	41.70	39.7	22.20	27.8	7.3	8.4	3	15
339	2	75276	45.30	47.0	23.30	30.0	7.1	7.4	3	15
340	2	75276	46.70	43.0	25.50	28.8	7.3	7.9	3	15
341	2	75276	40.00	46.5	22.20	26.7	7.2	7.3	3	15
342	2	76985	45.00	41.3	22.20	31.1	6.8	7.0	3	1
343	2	76985	49.00	44.3	26.60	30.0	6.3	8.3	3	28
344	2	76985	47.30	43.7	25.50	31.1	6.7	7.5	3	28
345	2	76985	44.30	43.7	25.50	30.0	6.9	7.1	3	29
346	2	76985	46.00	43.7	25.50	30.0	6.6	8.2	3	30
347	2	12130	43.30	42.0	25.50	28.9	7.6	8.4	3	2
348	2	12130	49.00	45.3	28.30	32.2	7.7	7.8	3	2
349	2	12130	47.00	42.3	22.20	31.1	5.9	6.4	3	2
350	2	12130	45.70	43.3	22.20	30.0	10.2	8.1	3	16
351	2	12130	48.30	45.7	21.10	32.2	8.0	8.7	3	16
352	2	32566		46.0		27.7	5.4	7.4	3	9
353	2	32566	46.70	49.3	24.40	27.7	8.1	8.4	3	10
354	2	32566	44.30	44.3	21.10	26.6	5.0	7.0	3	10
355	2	32566	49.30	45.6	23.30	26.6	7.5	7.1	3	10
356	2	32566	47.70	41.0	23.30	27.7	8.3	7.5	3	27
357	2	6248	46.00	48.7	31.10	25.5	6.8	7.5	3	12
358	2	6248	38.70	43.3	23.30	33.3	6.0	7.2	3	12
359	2	6248	47.00	43.3	25.50	28.9	5.8	7.6	3	12
360	2	6248	47.00	44.7	27.70	28.9	6.7	6.3	3	29
361	2	6248	45.50	46.0	25.00	31.5	5.9	7.0	3	29
362	2	834	45.30	46.0	23.30	35.6	6.0	7.1	3	2
363	2	834	45.00	47.0	24.40	32.2	6.1	7.9	3	24
364	2	834	48.70	46.0	27.70	26.6	5.7	7.3	3	24
365	2	834	44.00	44.7	33.30	36.6	6.2	8.1	3	24
366	2	834	41.70	46.0	24.40	33.3	5.9	7.2	3	24
367	2	26235	44.30	48.7	27.70	21.1	6.8	5.4	3	10
368	2	26235	47.30	43.0	17.70	30.0	11.7	8.7	3	10
369	2	26235	42.00	47.3	28.90	30.1	6.3	6.2	3	11
370	2	26235	45.70	37.0	26.60	26.6	5.0	7.2	3	11
371	2	26235	41.30	39.7	22.20	31.1	5.9	6.8	3	12
372	2	72914	44.30	42.0	25.50	34.4	9.5	9.7	3	15
373	2	72914	45.00	45.3	25.50	32.2	10.8	10.3	3	16
374	2	72914	45.70	42.7	26.60	35.5	11.2	7.9	3	17
375	2	72914	46.00	44.3	28.80	31.1	9.4	8.0	3	18
376	2	72914	48.00	44.0	27.70	32.2	9.2	9.1	3	18
377	2	404373	45.30	44.0	26.60	31.1	8.6	7.5	3	23
378	2	404373	44.70	45.0	26.60	32.2	8.4	7.5	3	23
379	2	404373	41.50	41.5	23.30	31.7	8.1	7.2	3	23
380	2	404373	48.00	41.0	23.30	29.8	9.7	8.6	3	23
381	2	404373	44.70	46.3	26.60	34.3	7.6	7.6	3	23
382	2	1027	42.30	43.0	18.90	27.7	8.7	9.2	3	17
383	2	1027	43.70	40.0	18.90	27.7	9.4	8.6	3	17
384	2	1027	38.00	38.3	18.90	25.5	10.0	10.1	3	30

A	L	M	P	R	S	T	U	V	W
337	1	121		345	24.7	6280	6440	83	83
338	2	121		360	27.4	0	0	0	0
339	3	121		365	27.4	0	0	0	0
340	4	121		340	27.4	0	0	0	0
341	5	121		360	28.8	0	0	0	0
342	2	116		0	0.0	0	0	0	0
343	1	116		0	0.0	0	0	0	0
344	2	116		0	0.0	0	0	0	0
345	2	116		0	0.0	0	0	0	0
346	2	116		0	0.0	0	0	0	0
347	1	100		0	0.0	0	0	0	0
348	2	100		0	0.0	0	0	0	0
349	4	100		0	0.0	0	0	0	0
350	2	100		0	0.0	0	0	0	0
351	3	100		0	0.0	0	0	0	0
352	2	101		0	0.0	0	0	0	0
353	1	101		0	0.0	0	0	0	0
354	3	101		0	0.0	0	0	0	0
355	5	101		0	0.0	0	0	0	0
356	4	101		0	0.0	0	0	0	0
357	2	102		0	0.0	0	0	0	0
358	3	102		0	0.0	0	0	0	0
359	4	102		0	0.0	0	0	0	0
360	4	102		0	0.0	0	0	0	0
361	5	102		0	0.0	0	0	0	0
362	5	111		0	0.0	0	0	0	0
363	2	111		0	0.0	0	0	0	0
364	3	111		0	0.0	0	0	0	0
365	3	111		0	0.0	0	0	0	0
366	3	111		0	0.0	0	0	0	0
367	4	97		0	0.0	0	0	0	0
368	5	97		0	0.0	0	0	0	0
369	3	97		0	0.0	0	0	0	0
370	4	97		0	0.0	0	0	0	0
371	2	97		0	0.0	0	0	0	0
372	5	123		0	0.0	0	0	0	0
373	2	123		0	0.0	0	0	0	0
374	2	123		0	0.0	0	0	0	0
375	3	123		0	0.0	0	0	0	0
376	4	123		0	0.0	0	0	0	0
377	1	101		0	0.0	0	0	0	0
378	2	101		0	0.0	0	0	0	0
379	3	101		0	0.0	0	0	0	0
380	4	101		0	0.0	0	0	0	0
381	5	101		0	0.0	0	0	0	0
382	3	149	7	295	26.0	5300	5330	161	161
383	4	149	7	295	26.0	0	0	0	0
384	1	149	7	285	26.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
385	2	1027	42.7	38.3	22.2	26.6	10.80	10.60	3	30
386	2	1027	46.7	42.3	22.2	27.7	9.50	8.80	3	30
387	2	15150	42.5	43.0	25.0	36.6	8.80	7.80	3	7
388	2	15150	42.7	41.5	23.3	33.3	9.30	7.70	3	7
389	2	15150	43.0	44.0	23.3	33.3	9.40	7.10	3	8
390	2	15150	43.0	45.0	23.3	35.0	9.10	8.00	3	8
391	2	15150	41.7	38.5	24.4	33.3	9.20	8.50	3	9
392	2	36219	44.0	46.0	23.3	31.1	9.90	9.30	3	10
393	2	36219	47.0	46.5	24.4	35.0	9.40	8.80	3	10
394	2	36219	44.7	42.0	25.5	34.4	8.90	8.80	3	11
395	2	36219	40.0	40.7	21.1	32.2	8.10	7.70	3	11
396	2	36219	45.3	46.0	21.1	30.0	9.60	9.30	3	15
397	2	36232	44.7	43.7	23.3	31.1	7.40	8.50	3	2
398	2	36232	45.0	40.0	23.3	28.9	7.20	8.50	3	30
399	2	36232	47.0	44.0	23.3	28.9	9.10	8.80	3	30
400	2	36232	45.0	44.5	23.3	30.0	8.60	9.60	3	30
401	2	36232	41.0	47.7	23.3	33.3	8.10	8.90	3	30
402	2	102351	47.3	51.0	25.5	33.3	7.50	7.90	3	9
403	2	102351	36.3	40.0	16.7	28.3	9.50	8.40	3	9
404	2	102351	45.0	45.5	24.4	31.7	8.00	8.00	3	10
405	2	102351	47.3	45.0	23.3	30.0	9.90	8.30	3	10
406	2	102351	45.7	42.0	25.5	33.3	8.60	7.60	3	11
407	2	49025	48.2	41.0	26.6	31.1	5.90	8.10	3	20
408	2	49025	49.7	42.3	25.5	32.2	7.00	6.00	3	20
409	2	49025	45.0	43.7	25.5	30.0	6.50	6.60	3	20
410	2	49025	49.7	38.0	26.6	28.3	7.70	7.50	3	20
411	2	18042	45.7	45.0	24.4	31.1	8.70	7.40	3	27
412	2	18042	45.7	42.7	24.4	31.1	7.00	7.60	3	27
413	2	18042	43.3	39.3	23.3	31.1	8.30	7.30	3	27
414	2	18042	44.7	45.0	24.4	33.3	8.40	6.90	3	27
415	2	51593	45.0	44.3	24.4	32.2	8.70	7.30	3	15
416	2	51593	50.7	49.3	25.5	32.2	9.10	7.10	3	15
417	2	48218	45.7	49.0	28.9	32.3	5.40	7.10	3	20
418	2	48218	47.7	44.0	25.5	34.4	7.50	7.20	3	20
419	2	48218	49.7	41.7	24.4	33.3	7.10	7.10	3	20
420	2	48218	51.7	46.0	26.6	35.5	7.60	7.20	3	20
421	2	48218	49.3	43.3	30.0	34.4	6.50	7.30	3	20
422	2	331	48.7	46.0	23.3	30.0	8.20	7.40	3	19
423	2	331	44.3	44.0	23.3	32.2	8.30	7.10	3	19
424	2	331	47.0	46.0	25.5	33.3	7.40	6.30	3	19
425	2	331	45.3	45.3	25.5	32.2	7.40	7.50	3	19
426	2	32479	44.3	44.3	21.1	33.3			3	28
427	2	32479	44.7	41.7	27.7	34.4			3	28
428	2	32479	47.0	46.0	30.0	33.3	7.50	7.60	3	28
429	2	32479	45.5	44.3	25.0	31.1	5.90	7.70	3	28
430	2	10099	40.5	41.5	21.7	33.3	10.20	7.00	3	1
431	2	10099	42.3	43.0	23.3	31.7	8.50	7.40	3	1
432	2	10099	45.0	46.3	35.5	25.5	8.20	7.50	3	1

A	L	M	P	R	S	T	U	V	W
385	2	149	7	305	26.0	0	0	0	0
386	3	149	7	295	26.0	0	0	0	0
387	3	133		330	24.7	5800	5750	0	0
388	4	133		310	26.0	0	0	0	0
389	2	133		330	27.4	0	0	0	0
390	3	133		345	27.4	0	0	0	0
391	3	133		330	27.4	0	0	0.	0
392	2	142		300	23.3	5850	5360	108	108
393	4	142		310	24.7	0	0	0	0
394	2	142		335	28.8	0	0	0	0
395	4	142		330	26.0	0	0	0	0
396	3	142		330	26.0	0	0	0	0
397	4	142		290	21.9	6160	5800	88	88
398	1	142		290	23.3	0	0	0	0
399	2	142		325	26.0	0	0	0	0
400	3	142		320	23.3	0	0	0	0
401	4	142		340	26.0	0	0	0	0
402	1	149		0	0.0	0	0	0	0
403	2	149		0	0.0	0	0	0	0
404	1	149		0	0.0	0	0	0	0
405	2	149		0	0.0	0	0	0	0
406	1	149		0	0.0	0	0	0	0
407	1	100		0	0.0	0	0	0	0
408	2	100		0	0.0	0	0	0	0
409	3	100		0	0.0	0	0	0	0
410	4	100		0	0.0	0	0	0	0
411	2	121		0	0.0	0	0	0	0
412	3	121		0	0.0	0	0	0	0
413	4	121		0	0.0	0	0	0	0
414	5	121		0	0.0	0	0	0	0
415	2	102		0	0.0	0	0	0	0
416	3	102		0	0.0	0	0	0	0
417	1	101		0	0.0	0	0	0	0
418	2	101		0	0.0	0	0	0	0
419	3	101		0	0.0	0	0	0	0
420	4	101		0	0.0	0	0	0	0
421	5	101		0	0.0	0	0	0	0
422	1	99		0	0.0	0	0	0	0
423	2	99		0	0.0	0	0	0	0
424	3	99		0	0.0	0	0	0	0
425	4	99		0	0.0	0	0	0	0
426	1	101		0	0.0	0	0	0	0
427	2	101		0	0.0	0	0	0	0
428	3	101		0	0.0	0	0	0	0
429	4	101		0	0.0	0	0	0	0
430	1	135		0	0.0	0	0	0	0
431	2	135		0	0.0	0	0	0	0
432	3	135		0	0.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J
433	2	10099	44.00	41.00	24.40	34.40	8.10	6.90	3
434	2	10099	42.50	39.50	23.30	33.30	9.70	7.60	3
435	2	14125	51.50	42.00	21.60	23.30	6.90	7.40	3
436	2	14125	49.70	47.00	20.00	25.50	6.50	7.30	3
437	2	14125	49.30	44.70	18.90	24.40	6.20	7.00	3
438	2	14125	49.50	46.00	20.00	24.80	6.80	7.00	3
439	2	14125	48.70	47.30	22.20	25.50	6.70	6.40	3
440	2	72567	44.30	47.50	15.50	21.70	9.60	9.30	3
441	2	72567	45.30	47.00	16.70	20.00	8.80	8.40	3
442	2	72567	43.50	43.40	16.70	20.70	9.50	9.40	3
443	2	72567	44.00	47.30	15.00	21.10	8.90	9.70	3
444	2	32607	47.70	45.30	27.80	21.10	7.90	8.00	3
445	2	32607	47.00	45.30	18.40	25.50	6.00	7.10	3
446	2	32607	43.50	46.30	15.00	24.40	7.60	6.70	3
447	2	32607	49.00	41.70	17.80	22.20			3
448	2	32607	43.70	45.30	16.70	23.30	6.30	7.50	3
449	2	32265	49.50	44.70	18.40	21.70	8.50	8.00	3
450	2	32265	45.30	43.00	16.70	25.50	5.90	6.90	3
451	2	32265	43.30	39.30	21.10	18.90	5.90	5.40	3
452	2	32265	44.50	43.70	16.70	23.30	4.90	5.80	3
453	2	32265	44.70	42.30	16.70	20.00	8.20	7.40	3
454	2	67399	44.00	42.70	15.60	26.60	5.10	7.10	3
455	2	67399	46.00	48.70	25.90	22.20	6.50	7.40	3
456	2	67399	43.00	39.00	20.00	25.00	5.10	5.60	3
457	2	67399	46.00	43.30	26.60	16.70	7.40	5.40	3
458	2	67399							3
459	2	77684	45.50	46.00	21.60	20.00	11.30	8.90	3
460	2	77684	44.00	44.30	24.40	17.80	10.10	8.60	3
461	2	77684	47.70	45.30	23.30	23.30	7.70	10.30	3
462	2	77684	38.30	46.00	21.10	17.80	10.00	7.70	3
463	2	77684	43.70	42.70	21.10	20.00	9.40	8.20	3
464	2	74091	42.70	45.30	16.70	25.50	6.80	6.60	3
465	2	74091	45.00	45.00	20.00	26.60	5.60	7.10	3
466	2	74091	43.50	44.00	16.70	23.30			3
467	2	74091	45.00	44.30	25.00	20.00	7.40	5.80	3
468	2	74091							3
469	2	69345	45.50	45.50	16.70	26.60	7.60	8.30	3
470	2	69345	43.70	44.00	21.10	26.60	8.00	7.60	3
471	2	69345	44.00	47.70	26.60	20.00	7.50	8.30	3
472	2	69345	45.00	44.50	23.30	24.90	8.20	7.40	3
473	2	69345	42.50	46.30	18.40	26.60	7.80	7.00	3
474	2	7496	41.50	46.50	21.60	33.30			3
475	2	7496	43.00	44.00	30.00	20.00	8.40	7.60	3
476	2	7496	45.30	47.00	26.60	21.70	7.70	7.90	3
477	2	7496	45.00	46.00	21.10	30.00	8.00	6.20	3
478	2	7496							3
479	2	9591	41.30	47.00	27.70	23.30	8.50	7.60	3
480	2	9591	45.00	46.00	26.60	30.00	8.50	6.40	3

A	K	L	M	P	R	S	T	U	V	W
433	1	4	135		0	0.0	0	0	0	0
434	1	5	135		0	0.0	0	0	0	0
435	24	1	96		0	0.0	0	0	0	0
436	24	2	96		0	0.0	0	0	0	0
437	24	3	96		0	0.0	0	0	0	0
438	24	4	96		0	0.0	0	0	0	0
439	24	5	96		0	0.0	0	0	0	0
440	5	3	83		0	0.0	0	0	0	0
441	6	1	83		0	0.0	0	0	0	0
442	6	2	83		0	0.0	0	0	0	0
443	6	3	83		0	0.0	0	0	0	0
444	7	1	101		0	0.0	0	0	0	0
445	7	2	101		0	0.0	0	0	0	0
446	7	3	101		0	0.0	0	0	0	0
447	7	4	101		0	0.0	0	0	0	0
448	7	5	101		0	0.0	0	0	0	0
449	25	1	88		0	0.0	0	0	0	0
450	25	2	88		0	0.0	0	0	0	0
451	25	3	88		0	0.0	0	0	0	0
452	25	4	88		0	0.0	0	0	0	0
453	25	5	88		0	0.0	0	0	0	0
454	1	2	80	53	335	24.7	5930	5780	107	83
455	22	4	80	53	320	23.3	0	0	0	0
456	15	3	80	53	355	26.0	0	0	0	0
457	25	4	80	53	335	24.7	0	0	0	0
458	0	0	80	53	320	23.3	0	0	0	0
459	9	1	80	11	250	23.3	5950	6320	83	89
460	9	2	80	11	300	24.7	0	0	0	0
461	11	2	80	11	300	26.0	0	0	0	0
462	18	3	80	11	265	23.3	0	0	0	0
463	25	2	80	11	260	23.3	0	0	0	0
464	26	3	121	7	395	28.8	5800	6250	89	89
465	26	4	121	7	400	28.8	0	0	0	0
466	26	5	121	7	410	30.1	0	0	0	0
467	28	3	121	7	410	30.1	0	0	0	0
468	0	0	121	7	395	28.8	0	0	0	0
469	16	1	83		0	0.0	0	0	0	0
470	16	2	83		0	0.0	0	0	0	0
471	23	4	83		0	0.0	0	0	0	0
472	23	5	83		0	0.0	0	0	0	0
473	30	2	83		0	0.0	0	0	0	0
474	2	1	99		415	28.8	5630	6140	39	39
475	12	5	99		430	28.8	0	0	0	0
476	22	3	99		380	27.4	0	0	0	0
477	22	4	99		380	28.8	0	0	0	0
478	0	0	99		435	30.1	0	0	0	0
479	6	4	96	1	400	28.8	5640	6850	95	95
480	6	5	96	1	385	28.8	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
481	2	9591	50.00	42.70	24.40	27.70	7.90	6.30	3	15
482	2	9591	43.00	44.70	26.60	25.50	8.10	7.00	3	21
483	2	9591	43.70	48.70	25.50	24.40	8.20	7.60	3	30
484	2	76388	43.50	47.00	25.30	25.00	9.90	8.60	3	29
485	2	76388	47.00	45.50	30.00	25.00	9.10	9.00	3	29
486	2	76388	45.00	42.00	25.50	31.10	9.20	9.10	3	29
487	2	76388	42.00	43.50	33.30	26.60	8.40	8.20	3	29
488	2	76388							3	0
489	2	81642	44.00	43.30	36.60	24.40	6.30	7.50	3	13
490	2	81642	44.70	39.70	26.[illegible]0	35.50	7.30	6.70	3	13
491	2	81642	46.50	40.00	38.20	26.60	6.60	7.50	3	17
492	2	81642	46.00	43.70	41.00	26.60	5.90	6.70	3	17
493	2	81642	45.30	44.70	44.30	33.30	6.30	7.20	3	28
494	2	11433	46.70	47.00	28.90	23.30	5.60	7.10	3	2
495	2	11433	46.00	42.50	28.30	21.70	5.40	6.50	3	19
496	2	11433	41.30	41.00	30.00	20.00	5.30	5.60	3	23
497	2	11433	44.00	45.70	31.10	23.30	5.70	6.50	3	27
498	2	11433	40.70	42.70	27.70	22.20	6.40	6.30	3	27
499	2	71900	38.00	43.50	30.00	21.70	7.90	7.30	3	10
500	2	71900	35.30	41.30	25.50	21.10	4.60	5.20	3	12
501	2	71900	44.00	38.70	21.10	25.50	6.30	6.20	3	12
502	2	71900	39.00	41.70	24.40	22.20	5.20	6.70	3	15
503	2	71900	42.30	45.70	20.00	30.00	6.70	7.50	3	21
504	2	6506	46.00	39.00	21.10	24.40	6.00	7.70	3	11
505	2	6506	26.50	39.00	18.30	25.00	10.10	6.80	3	11
506	2	6506	42.30	48.00	28.90	25.00	4.60	5.80	3	12
507	2	6506	46.00	50.00	23.30	30.00	6.80	5.00	3	12
508	2	6506							3	0
509	2	32432	38.50	44.50	28.30	23.30	6.50	5.90	3	22
510	2	32432	40.30	41.00	30.00	18.90	8.90	8.50	3	22
511	2	32432	41.00	41.00	30.00	28.90	9.00	9.50	3	22
512	2	32432	39.00	40.00	26.60	21.10	6.10	6.90	3	22
513	2	32432	45.00	38.50	25.00	28.30	9.30	9.60	3	22
514	2	77644	47.00	46.00	31.10	28.30	8.60	8.90	3	3
515	2	77644	40.00	46.00	30.00	25.50	9.60	11.00	3	3
516	2	77644	44.00	41.00	20.00	30.00	9.70	9.50	3	3
517	2	77644	39.30	39.70	31.10	28.90	9.10	9.00	3	3
518	2	77644	41.50	43.50	28.30	25.00	9.60	8.90	3	3
519	2	27776	41.30	44.70	32.20	25.50	6.90	7.40	3	13
520	2	27776	41.00	46.30	32.20	26.60	6.80	8.10	3	13
521	2	27776	45.70	46.30	35.50	23.30	6.00	7.60	3	13
522	2	27776	42.00	36.30	25.30	30.00	7.30	6.90	3	30
523	2	27776	42.00	40.30	23.30	33.30	7.60	6.10	3	30
524	2	79275	38.00	42.50	30.00	23.30	7.20	7.20	3	15
525	2	79275	46.70	38.70	30.00	23.30	7.00	7.30	3	15
526	2	79275	38.30	42.30	30.00	22.20	6.70	7.30	3	15
527	2	79275	44.30	38.00	24.40	30.00	6.70	6.80	3	15
528	2	79275	44.00	36.50	23.30	31.70	6.60	7.20	3	15

A	L	M	P	R	S	T	U	V	W
481	4	96	1	385	28.8	0	0	0	0
482	4	96	1	360	27.4	0	0	0	0
483	4	96	1	300	23.3	0	0	0	0
484	2	80	49	375	27.4	6080	6360	91	89
485	3	80	49	365	27.4	0	0	0	0
486	4	80	49	355	28.8	0	0	0	0
487	5	80	49	385	28.8	0	0	0	0
488	0	80	49	340	26.0	0	0	0	0
489	2	78	2	425	30.1	6930	6350	39	39
490	3	78	2	395	28.8	0	0	0	0
491	1	78	2	410	28.8	0	0	0	0
492	2	78	2	415	30.1	0	0	0	0
493	3	78	2	380	27.4	0	0	0	0
494	2	123	92	255	21.9	5860	6150	107	0
495	2	123	92	310	26.0	0	0	0	0
496	2	123	92	280	24.7	0	0	0	0
497	2	123	92	305	26.0	0	0	0	0
498	3	123	92	280	24.7	0	0	0	0
499	3	136	2	345	30.1	5130	6020	77	92
500	2	136	2	305	28.8	0	0	0	0
501	3	136	2	315	28.8	0	0	0	0
502	3	136	2	320	28.8	0	0	0	0
503	4	136	2	315	30.1	0	0	0	0
504	4	113	27	320	28.8	5750	5960	77	92
505	5	113	27	320	28.8	0	0	0	0
506	4	113	27	310	28.8	0	0	0	0
507	5	113	27	330	30.1	0	0	0	0
508	0	113	27	295	27.4	0	0	0	0
509	1	98	35	315	24.7	5090	5410	0	0
510	2	98	35	335	26.0	0	0	0	0
511	3	98	35	335	26.0	0	0	0	0
512	4	98	35	290	23.3	0	0	0	0
513	5	98	35	310	26.0	0	0	0	0
514	1	118	7	295	26.0	5840	5640	0	0
515	2	118	7	345	30.1	0	0	0	0
516	3	118	7	340	30.1	0	0	0	0
517	4	118	7	310	28.8	0	0	0	0
518	5	118	7	288	28.8	0	0	0	0
519	2	119	7	340	24.7	6180	5280	113	108
520	3	119	7	385	28.8	0	0	0	0
521	4	119	7	380	28.8	0	0	0	0
522	2	119	7	360	28.8	0	0	0	0
523	3	119	7	350	27.4	0	0	0	0
524	1	79	14	315	23.3	5400	5150	116	93
525	2	79	14	315	24.7	0	0	0	0
526	3	79	14	290	24.7	0	0	0	0
527	4	79	14	355	27.4	0	0	0	0
528	5	79	14	340	26.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J
529	2	76438	51.0	49.0	30.0	23.3	6.7	7.2	3
530	2	76438	45.3	52.7	32.2	23.3	6.8	7.8	3
531	2	76438	47.7	47.7	34.3	21.1	7.7	7.7	3
532	2	76438	45.3	52.7	34.4	22.2	6.8	7.8	3
533	2	76438	49.0	50.5	31.7	20.0	7.7	7.7	3
534	2	36214	46.0	48.0	30.0	21.7	6.1	6.9	3
535	2	36214	46.3	42.3	21.1	27.7	7.7	6.0	3
536	2	36214	43.7	45.7	30.0	24.4	5.9	7.8	3
537	2	36214	41.3	46.0	31.1	23.3	7.2	7.5	3
538	2	36214	48.0	45.5	30.0	23.3	6.6	7.3	3
539	2	36475	45.0	46.5	25.0	23.3	6.4	7.1	3
540	2	36475	47.0	44.7	23.3	30.0	6.9	6.7	3
541	2	36475	47.7	44.3	30.0	22.2	6.3	6.9	3
542	2	36475	42.7	38.5	23.3	30.0	7.1	6.7	3
543	2	81689	47.0	52.5	33.3	25.0	9.4	9.5	3
544	2	81689	45.3	53.3	33.3	24.4	10.8	9.9	3
545	2	81689	42.0	47.3	32.2	23.3	10.1	10.1	3
546	2	81689	50.7	52.3	31.1	26.6	10.5	10.8	3
547	2	81689	52.5	51.5	26.6	30.0	9.2	9.8	3
548	2	76457	44.0	50.5	26.6	23.3	10.2	8.6	3
549	2	76457	51.7	50.7	23.3	30.0	8.7	9.5	3
550	2	76457	49.7	51.0	22.2	30.0	8.8	10.0	3
551	2	76457	51.3	50.0	23.3	28.9	8.5	10.0	3
552	2	76457	52.5	48.5	23.3	25.0	8.8	8.3	3
553	2	7478	42.7	51.3	28.9	24.4	5.9	5.8	3
554	2	7478	48.0	49.0	30.0	23.3	5.4	6.8	3
555	2	7478	47.7	46.0	24.4	33.3	6.9	6.7	3
556	2	7478	50.7	46.3	23.3	31.1	7.2	6.9	3
557	2	7478	45.5	49.5	30.0	21.7	6.1	7.1	3
558	2	7291	42.4	26.5	30.0	18.4	8.4	9.1	3
559	2	7291	43.5	46.7	31.7	23.3	7.7	8.0	3
560	2	7291	44.3	47.3	32.2	23.3	6.0	7.5	3
561	2	7291	43.0	44.0	21.7	30.0	7.5	7.9	3
562	2	7291	43.5	46.5	30.0	23.3	8.4	7.0	3
563	2	22007	45.5	47.5	30.0	23.3	10.0	9.4	3
564	2	22007	44.3	45.3	26.6	21.1	9.5	9.6	3
565	2	22007	45.7	37.3	21.1	27.7	7.0	6.7	3
566	2	22007	43.0	42.7	27.7	21.1	8.7	8.5	3
567	2	22007	42.0	45.5	31.7	20.0	8.5	8.9	3
568	2	72952	46.0	47.0	24.4	25.0	7.5	8.4	3
569	2	72952	41.5	44.5	21.7	30.0	7.5	8.3	3
570	2	72952	43.0	42.0	22.2	27.7	8.1	6.4	3
571	2	72952	43.7	47.0	23.3	30.0	7.1	8.2	3
572	2	72952	47.0	49.0	31.1	23.3	5.7	6.1	3
573	2	22475	42.5	43.0	31.7	23.3	7.8	7.2	[illegible]
574	2	22475	45.7	46.0	23.3	32.2	7.7	7.3	3
575	2	22475	41.7	47.3	31.1	25.5	7.4	7.1	3
576	2	22475	49.0	45.3	25.5	25.5	7.0	7.0	3

A	K	L	M	P	R	S	T	U	V	W
529	8	1	80	59	380	27.4	5860	5500	89	89
530	8	2	80	59	395	28.8	0	0	0	0
531	8	3	80	59	405	28.8	0	0	0	0
532	8	4	80	59	395	28.8	0	0	0	0
533	8	5	80	59	415	28.8	0	0	0	0
534	24	1	142		325	24.7	6150	6160	0	100
535	24	2	142		310	24.7	0	0	0	0
536	24	3	142		325	26.0	0	0	0	0
537	24	4	142		300	24.7	0	0	0	0
538	24	5	142		320	24.7	0	0	0	0
539	10	1	142	94	0	0.0	6430	5880	0	0
540	10	2	142	94	0	0.0	0	0	0	0
541	21	4	142	94	0	0.0	0	0	0	0
542	30	2	142	94	0	0.0	0	0	0	0
543	11	1	78	3	400	28.8	5850	5790	100	100
544	11	2	78	3	430	31.5	0	0	0	0
545	11	3	78	3	395	28.8	0	0	0	0
546	19	4	78	3	430	30.1	0	0	0	0
547	19	5	78	3	400	30.1	0	0	0	0
548	13	1	80	73	340	26.0	5750	5800	89	107
549	13	2	80	73	360	27.4	0	0	0	0
550	13	3	80	73	345	27.4	0	0	0	0
551	13	4	80	73	380	27.4	0	0	0	0
552	13	5	80	73	370	27.4	0	0	0	0
553	7	2	110	74	365	30.1	6070	6180	107	107
554	7	3	110	74	345	30.1	0	0	0	0
555	10	3	110	74	335	30.1	0	0	0	0
556	10	4	110	74	355	30.1	0	0	0	0
557	10	5	110	74	355	30.1	0	0	0	0
558	8	5	111	24	345	30.1	6280	6520	108	107
559	13	5	111	24	365	31.5	0	0	0	0
560	17	4	111	24	330	28.8	0	0	0	0
561	17	5	111	24	390	32.9	0	0	0	0
562	27	5	111	24	290	28.8	0	0	0	0
563	12	1	123	98	375	27.4	6150	6180	108	123
564	12	2	123	98	405	27.4	0	0	0	0
565	12	3	123	98	350	27.4	0	0	0	0
566	12	4	123	98	370	28.8	0	0	0	0
567	12	5	123	98	375	27.4	0	0	0	0
568	15	4	83		0	0.0	0	0	0	0
569	15	5	83		0	0.0	0	0	0	0
570	12	2	83		0	0.0	0	0	0	0
571	28	2	83		0	0.0	0	0	0	0
572	28	3	83		0	0.0	0	0	0	0
573	8	1	122	91	0	0.0	0	0	0	0
574	8	2	122	91	0	0.0	0	0	0	0
575	8	3	122	91	0	0.0	0	0	0	0
576	11	4	122	91	0	0.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J
577	2	22475	37.0	43.0	28.3	23.3	6.3	7.6	3
578	2	404310	41.7	48.7	32.2	28.8	6.6	7.5	3
579	2	404310	43.5	47.0	31.7	30.0	7.4	7.5	3
580	2	404310	47.0	43.0	22.2	30.0	8.0	7.4	3
581	2	404310	47.0	50.3	34.4	30.0	7.8	7.4	3
582	2	404310	46.0	48.3	31.1	21.1	7.8	8.1	3
583	2	8181	37.5	40.5	28.3	20.0	9.5	8.2	3
584	2	8181	44.3	41.3	21.1	28.9	8.6	8.9	3
585	2	8181	44.0	45.7	33.3	21.1	8.2	8.3	3
586	2	8181	38.7	44.0	31.1	20.0	7.4	7.6	3
587	2	8181	40.0	47.5	26.6	23.3	6.3	7.9	3
588	2	97683	42.7	48.0	30.0	27.7	9.8	8.0	3
589	2	97683	43.0	42.0	33.3	23.3	8.4	7.3	3
590	2	97683	41.0	45.3	30.0	26.6	8.5	7.6	3
591	2	97683	38.0	39.5	30.0	21.7	9.5	7.0	3
592	2	97683	42.3	43.7	31.1	23.3	10.0	8.2	3
593	2	7441	48.0	47.5	33.3	25.0	8.5	7.5	3
594	2	7441	54.7	49.3	30.0	23.3	8.3	8.2	3
595	2	7441	47.0	46.0	27.8	32.2	7.2	7.2	3
596	2	7441	41.0	45.0	28.9	24.4	8.2	7.1	3
597	2	7441	47.0	49.5	30.0	23.3	7.8	7.3	3
598	2	27192	43.0	42.0	30.0	20.0	6.8	5.0	3
599	2	27192	35.7	36.3	28.9	20.0	6.6	6.1	3
600	2	27192	31.0	37.7	27.7	20.0	7.1	5.8	3
601	2	27192	37.7	38.7	33.3	21.1	6.7	5.2	3
602	2	27192	37.0	38.7	21.1	30.0	6.0	7.2	3
603	2	36131	38.3	40.0	27.7	36.6	5.8	6.9	3
604	2	36131	35.3	29.7	32.2	23.3	7.4	6.2	3
605	2	36131	45.5	38.5	33.3	23.0	5.6	4.7	3
606	2	36131	38.3	38.7	22.2	33.3	7.5	8.0	3
607	2	36131	37.7	37.3	24.4	32.2	7.1	7.5	3
608	2	18985	32.0	36.0	28.3	30.0	9.3	9.2	3
609	2	18985	43.5	45.5	31.7	23.3	7.7	8.3	3
610	2	18985	43.7	37.0	30.0	23.3	9.3	9.1	3
611	2	18985	43.5	39.5	20.0	30.0	6.5	7.7	3
612	2	18985	35.0	38.0	22.2	27.7	7.9	7.7	3
613	2	72927	43.5	48.5	33.3	21.7	9.3	7.4	3
614	2	72927	44.3	45.3	33.3	21.1	8.2	7.0	3
615	2	72927	42.5	45.0	33.3	21.7	7.3	8.6	3
616	2	72927	47.3	38.5	24.4	28.3	6.1	7.9	3
617	2	72927	47.0	39.5	21.7	30.0	8.9	7.7	3
618	2	1264	38.0	44.0	30.0	21.7	7.8	6.8	3
619	2	1264	42.0	44.3	30.0	24.4	7.6	6.3	3
620	2	1264	43.3	46.0	24.4	25.5	7.5	7.1	3
621	2	1264	46.3	39.7	26.6	32.2	6.7	7.3	3
622	2	1264	43.5	46.0	33.3	23.3	7.2	6.3	3
623	2	7889	41.5	48.0	33.3	23.3	7.5	6.0	3
624	2	7889	45.0	48.7	34.4	23.3	7.4	6.4	3

A	K	L	M	P	R	S	T	U	V	W
577	11	5	122	91	0	0.0	0	0	0	0
578	1	4	101		0	0.0	0	0	0	0
579	1	5	101		0	0.0	0	0	0	0
580	9	2	101		0	0.0	0	0	0	0
581	9	3	101		0	0.0	0	0	0	0
582	9	4	101		0	0.0	0	0	0	0
583	13	1	126	47	305	24.7	5330	5910	0	0
584	13	2	126	47	290	24.7	0	0	0	0
585	13	3	126	47	310	26.0	0	0	0	0
586	13	4	126	47	315	26.0	0	0	0	0
587	13	5	126	47	320	27.4	0	0	0	0
588	9	2	114		245	20.5	5410	5650	99	0
589	20	3	114		240	21.9	0	0	0	0
590	20	4	114		240	21.9	0	0	0	0
591	20	5	114		250	21.9	0	0	0	0
592	30	2	114		250	21.9	0	0	0	0
593	17	1	99	71	0	0.0	0	0	0	0
594	17	2	99	71	0	0.0	0	0	0	0
595	17	3	99	71	0	0.0	0	0	0	0
596	17	4	99	71	0	0.0	0	0	0	0
597	17	5	99	71	0	0.0	0	0	0	0
598	15	1	96		0	0.0	0	0	0	0
599	15	2	96		0	0.0	0	0	0	0
600	15	3	96		0	0.0	0	0	0	0
601	17	2	96		0	0.0	0	0	0	0
602	17	3	96		0	0.0	0	0	0	0
603	9	2	143	70	300	26.0	4620	6200	0	98
604	20	2	143	70	310	27.4	0	0	0	0
605	20	3	143	70	330	28.8	0	0	0	0
606	20	4	143	70	340	28.8	0	0	0	0
607	30	2	143	70	325	28.8	0	0	0	0
608	11	5	137		285	24.7	6390	6020	104	89
609	17	1	137		330	27.4	0	0	0	0
610	17	2	137		345	28.8	0	0	0	0
611	17	3	137		365	28.8	0	0	0	0
612	17	4	137		340	28.8	0	0	0	0
613	4	5	123	50	360	28.8	5870	5620	80	78
614	14	4	123	50	335	27.4	0	0	0	0
615	14	5	123	50	335	28.8	0	0	0	0
616	26	4	123	50	305	27.4	0	0	0	0
617	26	5	123	50	290	26.0	0	0	0	0
618	15	1	122	97	365	27.4	6130	6130	95	94
619	15	2	122	97	360	27.4	0	0	0	0
620	15	3	122	97	375	27.4	0	0	0	0
621	15	4	122	97	350	27.4	0	0	0	0
622	15	5	122	97	355	27.4	0	0	0	0
623	10	1	109		0	0.0	0	0	0	0
624	10	2	109		0	0.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
625	2	7889	48.70	43.70	23.30	32.20	6.8	7.1	3	10
626	2	7889	48.50	41.50	26.70	25.00	7.6	6.6	3	24
627	2	7889	43.00	46.30	30.00	23.30	7.2	6.6	3	24
628	2	74295	49.50	42.80	25.50	35.50	8.2	8.7	3	19
629	2	74295	46.80	51.20	25.00	33.30	8.4	8.1	3	19
630	2	74295	47.30	45.70	26.60	33.30	7.9	8.8	3	19
631	2	74295	40.20	49.70	31.60	26.10	8.3	7.8	3	24
632	2	74295	50.00	40.30	26.60	35.80	7.9	7.5	3	24
633	2	72797	45.30	47.50	29.20	22.50	8.6	7.3	3	29
634	2	72797	45.50	46.30	23.90	30.60	7.5	8.4	3	29
635	2	72797	45.50	44.20	28.90	25.00	8.3	7.5	3	29
636	2	72797	44.20	44.70	30.60	24.40	7.8	9.8	3	29
637	2	72797	42.30	46.50	28.30	25.00	8.0	8.6	3	29
638	2	36915	42.80	50.30	25.00	34.20	6.8	7.0	3	10
639	2	36915	45.80	44.70	27.20	34.40	5.1	6.1	3	10
640	2	36915	45.70	44.70	26.10	32.20	5.5	6.9	3	10
641	2	36915	50.00	45.80	23.90	34.40	6.9	6.5	3	10
642	2	36915	37.80	41.50	24.20	29.20	6.4	6.8	3	10
643	2	87	41.80	45.80	31.70	24.20	7.7	6.4	3	8
644	2	87	42.30	46.70	31.70	25.00	7.2	6.6	3	22
645	2	87	43.30	38.30	24.20	28.30	6.9	7.2	3	22
646	2	87	38.70	43.20	32.20	22.80	7.3	7.0	3	28
647	2	87	41.00	44.00	32.80	23.40	6.9	7.7	3	28
648	2	99484	48.50	44.00	33.30	20.90	4.8	5.3	3	4
649	2	99484	42.30	48.50	32.20	21.70	6.0	6.5	3	4
650	2	99484	44.00	47.50	31.10	22.80	6.7	4.5	3	4
651	2	99484	48.30	38.20	26.60	31.70	5.1	4.9	3	4
652	2	99484	46.30	48.50	25.00	30.80	7.5	7.0	3	4
653	2	76503	46.50	47.00	22.20	30.60	5.8	6.9	3	1
654	2	76503	43.30	47.70	21.10	30.00	5.8	7.2	3	1
655	2	76503	46.00	42.00	25.00	30.50	5.8	6.7	3	11
656	2	76503	50.30	42.50	23.30	28.30	6.0	7.2	3	11
657	2	76503	48.30	40.00	30.00	20.00	7.9	9.4	3	25
658	2	46405	49.50	47.30	23.30	31.70	7.4	7.3	3	9
659	2	46405	43.00	46.80	30.90	21.10	8.6	8.4	3	16
660	2	46405	45.80	44.70	31.70	19.50	8.5	7.5	3	16
661	2	46405	45.30	46.80	25.80	20.90	7.7	7.0	3	21
662	2	46405	42.80	50.00	30.00	22.50	8.4	8.3	3	21
663	2	74746	47.50	48.50	30.90	25.00	7.3	6.4	3	23
664	2	74746	46.20	44.70	21.10	33.30	8.2	6.7	3	23
665	2	74746	42.00	49.30	29.40	24.40	7.3	7.5	3	23
666	2	74746	39.30	36.70	29.40	20.00	7.9	7.2	3	23
667	2	74746	47.50	48.50	31.70	24.20	9.2	7.7	3	23
668	2	27331	43.30	38.50	20.00	28.30	7.5	6.4	3	13
669	2	27331	41.20	42.80	29.40	18.90	6.6	7.9	3	13
670	2	27331	43.00	46.00	30.60	20.90	6.6	7.5	3	13
671	2	27331	41.80	44.20	30.00	20.60	6.0	7.7	3	13
672	2	27331	40.50	35.00	28.30	21.70	6.4	8.0	3	13

A	L	M	P	R	S	T	U	V	W
625	3	109		0	0.0	0	0	0	0
626	1	109		0	0.0	0	0	0	0
627	2	109		0	0.0	0	0	0	0
628	2	82		0	0.0	0	0	0	0
629	3	82		0	0.0	0	0	0	0
630	4	82		0	0.0	0	0	0	0
631	4	82		0	0.0	0	0	0	0
632	5	82		0	0.0	0	0	0	0
633	1	83		0	0.0	0	0	0	0
634	2	83		0	0.0	0	0	0	0
635	3	83		0	0.0	0	0	0	0
636	4	83		0	0.0	0	0	0	0
637	5	83		0	0.0	0	0	0	0
638	1	99		400	30.4	5850	6150	108	119
639	2	99		370	28.8	0	0	0	0
640	3	99		380	30.1	0	0	0	0
641	4	99		395	30.1	0	0	0	0
642	5	99		380	30.1	0	0	0	0
643	5	112	86	310	24.7	5940	6240	87	0
644	4	112	86	300	24.7	0	0	0	0
645	5	112	86	325	27.4	0	0	0	0
646	2	112	86	310	26.0	0	0	0	0
647	3	112	86	310	26.0	0	0	0	0
648	1	113	54	315	23.3	5600	5420	0	0
649	2	113	54	320	24.7	0	0	0	0
650	3	113	54	315	23.3	0	0	0	0
651	4	113	54	290	21.9	0	0	0	0
652	5	113	54	305	23.3	0	0	0	0
653	3	80	58	350	24.7	6150	5890	89	107
654	4	80	58	380	27.4	0	0	0	0
655	4	80	58	360	26.0	0	0	0	0
656	5	80	58	340	26.0	0	0	0	0
657	5	80	58	350	24.7	0	0	0	0
658	1	80	26	395	28.8	5960	6000	83	106
659	3	80	26	375	27.4	0	0	0	0
660	4	80	26	400	28.8	0	0	0	0
661	1	80	26	390	28.8	0	0	0	0
662	2	80	26	390	27.4	0	0	0	0
663	1	122		0	0.0	0	0	0	0
664	2	122		0	0.0	0	0	0	0
665	3	122		0	0.0	0	0	0	0
666	4	122		0	0.0	0	0	0	0
667	5	122		0	0.0	0	0	0	0
668	1	96		0	0.0	0	0	0	0
669	2	96		0	0.0	0	0	0	0
670	3	96		0	0.0	0	0	0	0
671	4	96		0	0.0	0	0	0	0
672	5	96		0	0.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J	K
673	2	3376	42.30	51.00	28.40	22.50	8.3	8.7	3	2
674	2	3376	42.30	50.80	27.50	23.30	8.7	8.4	3	4
675	2	3376	42.00	48.50	28.40	23.30	7.8	8.4	3	4
676	2	3376	48.30	44.20	22.80	32.80	7.4	8.4	3	21
677	2	3376	48.20	48.20	31.10	22.20	7.6	8.7	3	21
678	2	6944	48.70	46.00	23.90	31.70	6.5	7.2	3	7
679	2	6944	48.70	47.50	23.30	33.30	7.0	7.6	3	7
680	2	6944	47.50	39.00	22.80	28.90	7.3	7.6	3	7
681	2	6944	46.70	47.50	32.20	25.50	7.3	6.5	3	18
682	2	6944	45.70	47.00	24.40	35.00	6.9	7.8	3	18
683	2	12999	43.00	39.30	20.00	29.20	8.2	7.6	3	3
684	2	12999	44.50	51.50	33.30	25.50	5.5	4.6	3	18
685	2	12999	50.00	45.00	23.30	27.50	9.7	8.5	3	18
686	2	12999	33.00	48.80	21.70	21.70	9.0	8.9	3	29
687	2	12999					4.7	4.9	3	18
688	2	77496	50.30	51.30	24.40	28.90	7.8	7.4	3	15
689	2	77496	44.00	42.30	21.70	30.60	7.2	7.5	3	15
690	2	77496	42.30	43.20	29.40	20.60	7.4	6.7	3	15
691	2	77496	48.20	43.80	22.80	32.70	7.3	7.2	3	25
692	2	77496	47.70	43.80	28.90	20.60	7.1	6.6	3	25
693	2	26682	49.20	41.00	21.10	27.20	6.5	7.8	3	15
694	2	26682	51.80	42.50	30.00	18.40	8.1	8.3	3	15
695	2	26682	43.70	45.50	27.20	21.10	6.7	5.9	3	30
696	2	26682	40.20	39.00	18.90	26.60	6.3	7.3	3	30
697	2	26682					7.0	6.1	3	15
698	2	49157	48.50	48.30	23.30	31.70	9.2	8.2	3	6
699	2	49157	44.80	47.70	27.50	23.30	6.9	7.5	3	6
700	2	49157	48.80	42.50	22.80	28.30	6.3	6.8	3	11
701	2	49157	41.70	48.70	27.70	25.00	6.8	6.4	3	11
702	2	49157	45.80	51.30	21.70	27.50	7.9	7.0	3	27
703	2	22479	48.80	50.50	30.00	24.20	4.7	4.3	3	3
704	2	22479	48.30	46.00	23.90	32.20	5.2	7.5	3	14
705	2	22479	41.30	48.80	28.90	23.30	6.6	5.5	3	14
706	2	22479	49.50	43.00	23.30	28.30	6.8	7.2	3	23
707	2	22479					7.1	6.5	3	23
708	2	22603	43.80	46.30	26.10	23.30	6.5	5.6	3	9
709	2	22603	42.70	40.70	21.70	27.20	8.2	7.4	3	9
710	2	22603	45.30	46.50	30.90	25.00	7.9	7.5	3	9
711	2	22603	49.30	49.00	33.30	25.00	7.9	8.0	3	20
712	2	22603	49.50	41.70	23.30	30.00	6.6	7.3	3	20
713	2	370	49.50	42.80	23.30	26.10	6.9	7.9	3	8
714	2	370	47.00	44.70	20.00	25.00	6.4	6.6	3	20
715	2	370	44.00	50.50	30.50	26.60	6.5	6.9	3	20
716	2	370					7.8	6.1	3	20
717	2	70862	33.00	40.20	21.70	17.80	5.5	6.6	3	2
718	2	70862	50.00	42.00	23.30	27.70	8.0	7.6	3	2
719	2	70862	42.00	44.70	28.30	23.30	7.6	8.2	3	2
720	2	70862	47.20	43.80	22.20	30.00	7.9	6.4	3	23

A	L	M	P	R	S	T	U	V	W
673	1	107	51	285	23.3	5480	5580	0	0
674	4	107	51	250	21.9	0	0	0	0
675	5	107	51	280	23.3	0	0	0	0
676	2	107	51	280	21.9	0	0	0	0
677	3	107	51	270	23.3	0	0	0	0
678	2	112	14	390	31.5	6340	6050	107	107
679	3	112	14	370	30.1	0	0	0	0
680	4	112	14	385	30.1	0	0	0	0
681	3	112	14	375	30.1	0	0	0	0
682	4	112	14	385	31.5	0	0	0	0
683	5	100		0	0.0	0	0	0	0
684	4	100		0	0.0	0	0	0	0
685	5	100		0	0.0	0	0	0	0
686	5	100		0	0.0	0	0	0	0
687	3	100		0	0.0	0	0	0	0
688	2	118		0	0.0	0	0	0	0
689	3	118		0	0.0	0	0	0	0
690	4	118		0	0.0	0	0	0	0
691	2	118		0	0.0	0	0	0	0
692	3	118		0	0.0	0	0	0	0
693	4	96		0	0.0	0	0	0	0
694	5	96		0	0.0	0	0	0	0
695	2	96		0	0.0	0	0	0	0
696	3	96		0	0.0	0	0	0	0
697	3	96		0	0.0	0	0	0	0
698	2	100		0	0.0	0	0	0	0
699	3	100		0	0.0	0	0	0	0
700	2	100		0	0.0	0	0	0	0
701	3	100		0	0.0	0	0	0	0
702	5	100		0	0.0	0	0	0	0
703	1	122	20	350	27.4	6140	6020	83	90
704	2	122	20	320	26.0	0	0	0	0
705	3	122	20	360	28.8	0	0	0	0
706	4	122	20	335	27.4	0	0	0	0
707	5	122	20	320	27.4	0	0	0	0
708	3	122	97	300	26.0	4960	5020	0	0
709	4	122	97	335	27.4	0	0	0	0
710	5	122	97	320	27.4	0	0	0	0
711	4	122	97	320	27.4	0	0	0	0
712	5	122	97	330	26.0	0	0	0	0
713	5	99		0	0.0	0	0	0	0
714	2	99		0	0.0	0	0	0	0
715	3	99		0	0.0	0	0	0	0
716	4	99		0	0.0	0	0	0	0
717	3	82		0	0.0	0	0	0	0
718	4	82		0	0.0	0	0	0	0
719	5	82		0	0.0	0	0	0	0
720	3	82		0	0.0	0	0	0	0

A	B	C	D	E	F	G	H	I	J
721	2	70862	49.3	45.0	21.7	28.9	8.5	6.9	3
722	2	72489	47.8	45.8	23.3	33.3	6.0	7.3	3
723	2	72489	48.0	45.8	23.3	30.0	8.2	7.1	3
724	2	72489	47.7	43.7	23.9	30.6	6.9	7.3	3
725	2	72489	45.5	46.8	23.3	33.3	8.4	7.6	3
726	2	72489	47.7	45.2	23.3	33.3	6.5	7.5	3
727	2	21720	42.0	41.2	22.2	24.4	3.8	4.2	3
728	2	21720	46.8	41.3	21.7	27.5	4.2	3.7	3
729	2	21720	41.0	43.5	19.2	30.0	7.7	7.9	3
730	2	21720	43.3	41.5	22.8	30.0	3.9	5.3	3
731	2	21720	38.5	43.7	19.5	28.3	5.3	6.9	3
732	2	48176	50.5	46.7	27.7	34.4	5.6	6.8	3
733	2	48176	44.0	46.3	24.2	30.0	8.5	8.0	3
734	2	48176	46.8	47.5	26.6	33.9	7.8	7.0	3
735	2	48176	46.3	48.7	26.6	35.5	5.9	6.9	3
736	2	48176	50.8	47.8	25.8	35.0	5.7	7.2	3
737	2	14240	51.0	42.5	23.9	27.8	6.9	8.5	3
738	2	14240	49.5	43.8	25.0	28.9	10.0	9.0	3
739	2	14240	50.5	49.8	25.0	31.6	8.4	8.7	3
740	2	14240	49.3	43.5	24.2	25.8	7.7	7.1	3
741	2	14240	49.3	45.2	23.3	26.6	10.0	9.5	3

A	K	L	M	P	R	S	T	U	V	W
721	23	4	82		0	0.0	0	0	0	0
722	7	2	122	90	355	28.8	7240	6490	48	48
723	7	3	122	90	355	27.4	0	0	0	0
724	7	4	122	90	335	28.8	0	0	0	0
725	12	3	122	90	290	26.0	0	0	0	0
726	12	4	122	90	370	30.1	0	0	0	0
727	5	2	123	62	300	23.3	5860	6000	92	92
728	5	3	123	62	320	24.7	0	0	0	0
729	6	5	123	62	275	23.3	0	0	0	0
730	22	3	123	62	280	24.7	0	0	0	0
731	22	4	123	62	310	24.7	0	0	0	0
732	4	4	101		0	0.0	0	0	0	0
733	4	5	101		0	0.0	0	0	0	0
734	13	3	101		0	0.0	0	0	0	0
735	13	4	101		0	0.0	0	0	0	0
736	17	5	101		0	0.0	0	0	0	0
737	3	2	96		0	0.0	0	0	0	0
738	3	3	96		0	0.0	0	0	0	0
739	7	4	96		0	0.0	0	0	0	0
740	7	5	96		0	0.0	0	0	0	0
741	16	2	96		0	0.0	0	0	0	0

APPENDIX G

ONE-FACTOR ANALYSIS OF VARIANCE

COMPLETELY RANDOMIZED DESIGN

RESERVE PARACHUTES

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	870.09590	145.015983
ERROR	194	2255.53664	11.626478
RESIDUAL	194	2255.53664	11.626478
CORRECTED TOTAL	200	3125.63254	15.628163

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	870.09590	145.015983
DENOMINATOR	ERROR	194	2255.53664	11.626478

F VALUE	PROB F
12.47241	0.0001

LSD .01	LSD .05
2.32940388	1.76607895

MEANS

YEAR	N	BREAKWAR
6	1	50.0000000
7	8	49.1250000
8	13	49.6153846
9	22	50.3181818
10	39	45.9487179
11	63	48.3492063
12	55	44.5072727
OVERALL MEANS	201	47.1686567

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	1255.25305	209.208841
ERROR	194	2842.16377	14.650329
RESIDUAL	194	2842.16377	14.650329
CORRECTED TOTAL	200	4097.41682	20.487084

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	1255.25305	209.208841
DENUMINATOR	ERROR	194	2842.16377	14.650329

F VALUE	PROB F
14.28015	0.0001

LSD .01	LSD .05
2.61483479	1.98248291

MEANS

YEAR	N	BREAKFIL
6	1	45.0000000
7	8	46.8750000
8	13	49.9230769
9	22	49.4090909
10	39	44.1794872
11	63	47.4444444
12	55	42.8854545
OVERALL MEANS	201	45.9039801

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	356.38753	59.3979213
ERROR	194	2481.13914	12.7893770
RESIDUAL	194	2481.13914	12.7893770
CORRECTED TOTAL	200	2837.52667	14.1876333

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	356.38753	59.3979213
DENOMINATOR	ERROR	194	2481.13914	12.7893770

F VALUE	PROB F
4.64432	0.0004

LSD .01	LSD .05
2.44312382	1.85229778

MEANS

YEAR	N	ELONGWAR
6	1	30.0000000
7	8	21.1250000
8	13	25.0769231
9	22	22.5454545
10	39	21.6666667
11	63	23.9365079
12	55	24.6581818
OVERALL MEANS	201	23.5333333

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	624.94502	104.157503
ERROR	194	2262.73657	11.663591
RESIDUAL	194	2262.73657	11.663591
CORRECTED TOTAL	200	2887.68159	14.438408

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	624.94502	104.157503
DENOMINATOR	ERROR	194	2262.73657	11.663591

F VALUE	PROB F
8.93014	0.0001

LSD .01	LSD .05
2.33311844	1.76689515

MEANS

YEAR	N	ELONGFIL
6	1	20.0000000
7	8	26.2500000
8	13	30.6923077
9	22	28.7727273
10	39	26.1282051
11	63	29.7936508
12	55	30.2363636
OVERALL MEANS	201	28.9601990

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	23.972192	3.99536527
ERROR	194	158.043778	0.81465865
RESIDUAL	194	158.043778	0.81465865
CORRECTED TOTAL	200	182.015970	0.91007985

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	23.972192	3.99536527
DENOMINATOR	ERROR	194	158.043778	0.81465865
			F VALUE	PROB F
			4.90434	0.0002

LSD .01	LSD .05
0.61660/189	0.46749174b

MEANS

YEAR	N	TEARWARP
6	1	7.90000000
7	8	8.03750000
8	13	6.70769231
9	22	7.37954545
10	39	6.53461538
11	63	7.04365079
12	55	7.19636364

OVERALL MEANS	201	7.04552239

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	65.734596	10.9557660
ERROR	194	140.487071	0.7241602
RESIDUAL	194	140.487071	0.7241602
CORRECTED TOTAL	200	206.221667	1.0311083

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	65.734596	10.9557660
DENOMINATOR	ERROR	194	140.487071	0.7241602

F VALUE	PROB F
15.12893	0.0001

LSD .01	LSD .05
0.581350565	0.440761260

MEANS

YEAR	N	TEARFILL
6	1	8.80000000
7	8	8.31250000
8	13	6.15384615
9	22	7.39545455
10	39	6.10128205
11	63	6.55793651
12	55	7.17000000

OVERALL MEANS 201 6.78333333

APPENDIX H

ONE-FACTOR ANALYSIS OF VARIANCE

COMPLETELY RANDOMIZED DESIGN

MAIN PARACHUTES

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	546.07930	91.0132165
ERROR	518	7155.05240	13.8128425
RESIDUAL	518	7155.05240	13.8128425
CORRECTED TOTAL	524	7701.13170	14.6966162

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	546.07930	91.0132165
DENOMINATOR	ERROR	518	7155.05240	13.8128425

F VALUE	PROB F
6.56903	0.0001

LSD .01	LSD .05
1.56906605	1.19232941

MEANS

YEAR	N	BREAKWAR
6	5	42.1400000
7	82	45.5463415
8	49	44.9000000
9	120	46.0266667
10	99	45.0242424
11	106	43.7613208
12	64	43.1953125

OVERALL MEANS	525	44.6179048

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	860.65105	143.441841
ERROR	518	6544.59741	12.634358
RESIDUAL	518	6544.59741	12.634358
CORRECTED TOTAL	524	7405.24846	14.132154

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	860.65105	143.441841
DENOMINATOR	ERROR	518	6544.59741	12.634358
			F VALUE	PROB F
			11.35331	0.0001

LSD .01	LSD .05
1.50063896	1.14033222

MEANS

YEAR	N	BREAKFIL
6	5	38.4000000
7	82	45.4341463
8	49	43.0408163
9	120	45.3391667
10	99	44.5000000
11	106	43.1047170
12	64	42.3671875

OVERALL MEANS	525	44.1017143

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	330.60599	55.1009978
ERROR	518	9575.79013	18.4860813
RESIDUAL	518	9575.79013	18.4860813
CORRECTED TOTAL	524	9906.39611	18.9053361

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	330.60599	55.1009978
DENOMINATOR	ERROR	518	9575.79013	18.4860813

F VALUE	PROB F
2.98067	0.0074

LSD .01	LSD .05
1.61519032	1.379[illegible]

MEANS

YEAR	N	ELONGWAR
6	5	21.66000[illegible]
7	82	26.1463415
8	49	23.5734694
9	120	25.2775000
10	99	26.0050505
11	106	25.1801887
12	64	24.9296875

OVERALL MEANS	525	25.2948571

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	876.81697	146.136161
ERROR	518	8657.10216	16.712552
RESIDUAL	518	8657.10216	16.712552
CORRECTED TOTAL	524	9533.91912	18.194502

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	876.81697	146.136161
DENOMINATOR	ERROR	518	8657.10216	16.712552

F VALUE	PROB F
8.74410	0.0001

LSD .01	LSD .05
1.72592163	1.31152344

MEANS

YEAR	N	ELONGFIL
6	5	28.8800000
7	82	25.9073171
8	49	25.1959184
9	120	29.0808333
10	99	27.7060606
11	106	27.0462264
12	64	28.5703125

OVERALL MEANS	525	27.4883810

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	58.50919	9.75153181
ERROR	518	1008.92993	1.94774118
RESIDUAL	518	1008.92993	1.94774118
CORRECTED TOTAL	524	1067.43912	2.03709756

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	58.50919	9.75153181
DENOMINATOR	ERROR	518	1008.92993	1.94774118

F VALUE	PROB F
5.00659	0.0002

LSD .01	LSD .05
0.589263656	0.447734296

MEANS

YEAR	N	TEARWARP
6	5	6.58000000
7	82	7.89048780
8	49	7.01224490
9	120	7.51416667
10	99	7.12626263
11	106	7.70377358
12	64	7.96562500
OVERALL MEANS	525	7.45504762

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	34.918290	5.81971497
ERROR	518	660.874739	1.27581996
RESIDUAL	518	660.874739	1.27581996
CORRECTED TOTAL	524	695.793029	1.32784929

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	34.918290	5.81971497
DENOMINATOR	ERROR	518	660.874739	1.27581996

F VALUE	PROB F
4.56155	0.0003

LSD .01	LSD .05
0.476863921	0.362367690

MEANS

YEAR	N	TEARFILL
6	5	6.96000000
7	82	7.97682927
8	49	7.15102041
9	120	7.49666667
10	99	7.33030303
11	106	7.26226415
12	64	7.59375000

OVERALL MEANS	525	7.46742857

APPENDIX I

ONE-FACTOR ANALYSIS OF VARIANCE

COMPLETELY RANDOMIZED DESIGN

RESERVE AND MAIN PARACHUTES COMBINED

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	597.1527	99.5254515
ERROR	719	11032.8275	15.3446836
RESIDUAL	719	11032.8275	15.3446836
CORRECTED TOTAL	725	11629.9802	16.0413520

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	597.1527	99.5254515
DENOMINATOR	ERROR	719	11032.8275	15.3446836

F VALUE	PROB F
6.48599	0.0001

LSD .01	LSD .05
1.40295601	1.06650734

MEANS

YEAR	N	BREAKWAR
6	6	43.4500000
7	90	45.8644444
8	62	45.8887097
9	142	46.6915493
10	138	45.2855072
11	169	45.4715976
12	119	43.8016807

OVERALL MEANS	726	45.4687328

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	986.9875	164.497918
ERROR	719	10987.8021	15.282061
RESIDUAL	719	10987.8021	15.282061
CORRECTED TOTAL	725	11974.7897	16.516951

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	986.9875	164.497918
DENOMINATOR	ERROR	719	10987.8021	15.282061

F VALUE	PROB F
10.76412	0.0001

LSD .01	LSD .05
1.40009022	1.06432819

MEANS

YEAR	N	BREAKFIL
6	6	39.5000000
7	90	45.5622222
8	62	44.4838710
9	142	45.9697183
10	138	44.4094203
11	169	44.7224852
12	119	42.6067227

OVERALL MEANS	726	44.6006887

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	144.3826	24.0637711
ERROR	719	13050.5601	18.1509877
RESIDUAL	719	13050.5601	18.1509877
CORRECTED TOTAL	725	13194.9428	18.1999210

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	144.3826	24.0637711
DENOMINATOR	ERROR	719	13050.5601	18.1509877
			F VALUE	PROB F
			1.32576	0.2421

LSD .01	LSD .05
1.52586174	1.15993786

MEANS

YEAR	N	ELONGWAR
6	6	23.0500000
7	90	25.7000000
8	62	23.8887097
9	142	24.8542254
10	138	24.7789855
11	169	24.7165680
12	119	24.8042017
OVERALL MEANS	726	24.8071625

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	987.8775	164.646253
ERROR	719	11748.5901	16.340181
RESIDUAL	719	11748.5901	16.340181
CORRECTED TOTAL	725	12736.4676	17.567542

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	987.8775	164.646253
DENOMINATOR	ERROR	719	11748.5901	16.340181

F VALUE	PROB F
10.07616	0.0001

LSD .01	LSD .05
1.44774914	1.10055828

MEANS

YEAR	N	ELONGFIL
6	6	27.4000000
7	90	25.9377778
8	62	26.3483871
9	142	29.0330986
10	138	27.2601449
11	169	28.0704142
12	119	29.3403361

OVERALL MEANS	726	27.8958678

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	73.96513	12.3275211
ERROR	719	1199.86696	1.6687997
RESIDUAL	719	1199.86696	1.6687997
CORRECTED TOTAL	725	1273.83208	1.7570098

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	73.96513	12.3275211
DENOMINATOR	ERROR	719	1199.86696	1.6687997

F VALUE	PROB F
7.38706	0.0001

LSD .01	LSD .05
0.462665558	0.351711750

MEANS

YEAR	N	TEARWARP
6	6	6.80000000
7	90	7.89444444
8	62	6.94838710
9	142	7.49330986
10	138	6.95905797
11	169	7.20680473
12	119	7.61008403

OVERALL MEANS	726	7.34166667

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	87.451178	14.5751964
ERROR	719	882.585905	1.2275186
RESIDUAL	719	882.585905	1.2275186
CORRECTED TOTAL	725	970.037083	1.3379822

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
NUMERATOR	YEAR	6	87.451178	14.5751964
DENOMINATOR	ERROR	719	882.585905	1.2275186
			F VALUE	PROB F
			11.87371	0.0001

LSD .01	LSD .05
0.396806836	0.301646988

MEANS

YEAR	N	TEARFILL
6	6	7.26666667
7	90	8.00666667
8	62	6.94193548
9	142	7.48098592
10	138	6.98297101
11	169	6.99970414
12	119	7.39789916

OVERALL MEANS	726	7.27803030

APPENDIX J

TWO-FACTOR ANALYSIS OF VARIANCE

RANDOMIZED COMPLETE BLOCK DESIGN

RESERVE PARACHUTES

MEANS

PANEL	N	BREAKWAR
1	45	47.2511111
2	58	47.0310345
3	23	46.4782609

YEAR	N	BREAKWAR
7	4	48.5000000
8	12	49.9166667
9	8	50.1250000
10	24	45.4583333
11	50	47.9600000
12	28	44.2892857

LSD .01	LSD .05
3.13378334	2.36927795

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	498.06361	99.6127222
PANEL	2	9.14468	4.5723420
YEAR*PANEL	8	74.65401	9.3317515
ERROR	110	1650.83809	15.0076190
RESIDUAL	110	1650.83809	15.0076190
CORRECTED TOTAL	125	2232.70040	17.8616032

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	498.06361	99.6127222	6.63748	0.0001
DENOMINATOR	ERROR	110	1650.83809	15.0076190		
NUMERATOR	PANEL	2	9.14468	4.5723420	0.30467	0.7425
DENOMINATOR	ERROR	110	1650.83809	15.0076190		
NUMERATOR	YEAR*PANEL	8	74.65401	9.3317515	0.62160	0.7594
DENOMINATOR	ERROR	110	1650.83809	15.0076190		

MEANS

PANEL	N	BREAKFIL
1	45	46.2155556
2	58	45.9051724
3	23	44.9695652

YEAR	N	BREAKFIL
7	4	45.7500000
8	12	50.1666667
9	8	49.7500000
10	24	43.9583333
11	50	47.0000000
12	28	42.3642857

LSD .01	LSD .05
3.09782600	2.34209347

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	837.46897	167.493794
PANEL	2	28.23200	14.115999
YEAR*PANEL	8	97.89525	12.236906
ERROR	110	1613.17204	14.665200
RESIDUAL	110	1613.17204	14.665200
CORRECTED TOTAL	125	2576.76825	20.614146

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	837.46897	167.493794	11.42117	0.0001
DENOMINATOR	ERROR	110	1613.17204	14.665200		
NUMERATOR	PANEL	2	28.23200	14.115999	0.96255	0.6129
DENOMINATOR	ERROR	110	1613.17204	14.665200		
NUMERATOR	YEAR*PANEL	8	97.89525	12.236906	0.83442	0.5752
DENOMINATOR	ERROR	110	1613.17204	14.665200		

MEANS

PANEL	N	ELONGWAR
1	45	23.5933333
2	58	23.0172414
3	23	22.7956522

YEAR	N	ELONGWAR
7	4	19.0000000
8	12	24.6666667
9	8	21.3750000
10	24	20.2916667
11	50	23.8400000
12	28	24.9642857

LSD .01	LSD .05
2.79019547	2.10951138

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	433.61730	86.7234603
PANEL	2	12.62126	6.3106317
YEAR*PANEL	8	64.65554	8.0819430
ERROR	110	1308.68748	11.8971589
RESIDUAL	110	1308.68748	11.8971589
CORRECTED TOTAL	125	1819.58159	14.5566527

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	433.61730	86.7234603	7.28943	0.0001
DENOMINATOR	ERROR	110	1308.68748	11.8971589		
NUMERATOR	PANEL	2	12.62126	6.3106317	0.53043	0.5954
DENOMINATOR	ERROR	110	1308.68748	11.8971589		
NUMERATOR	YEAR*PANEL	8	64.65554	8.0819430	0.67932	0.7105
DENOMINATOR	ERROR	110	1308.68748	11.8971589		

MEANS

PANEL	N	ELONGFIL
1	45	29.2000000
2	58	29.4482759
3	23	29.0434783

YEAR	N	ELONGFIL
7	4	22.5000000
8	12	30.7500000
9	8	28.7500000
10	24	26.9166667
11	50	29.7400000
12	28	31.0000000

LSD .01	LSD .05
2.73478508	2.06761837

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	439.51095	87.9021905
PANEL	2	3.21294	1.6064682
YEAR*PANEL	8	83.76394	10.4704927
ERROR	110	1257.22646	11.4293314
RESIDUAL	110	1257.22646	11.4293314
CORRECTED TOTAL	125	1783.71429	14.2697143

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	439.51095	87.9021905	7.69093	0.0001
DENOMINATOR	ERROR	110	1257.22646	11.4293314		
NUMERATOR	PANEL	2	3.21294	1.6064682	0.14056	0.8693
DENOMINATOR	ERROR	110	1257.22646	11.4293314		
NUMERATOR	YEAR*PANEL	8	83.76394	10.4704927	0.91611	0.5068
DENOMINATOR	ERROR	110	1257.22646	11.4293314		

MEANS

PANEL	N	TEARWARP
1	45	7.08555556
2	58	7.05689655
3	23	6.93043478

YEAR	N	TEARWARP
7	4	7.90000000
8	12	6.72500000
9	8	7.86250000
10	24	6.64166667
11	50	7.00300000
12	28	7.24285714

LSD .01	LSD .05
0.712156117	0.538421512

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARD

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	14.587831	2.91756619
PANEL	2	0.383988	0.19199379
YEAR*PANEL	8	1.796814	0.22460179
ERROR	110	85.254403	0.77504003
RESIDUAL	110	85.254403	0.77504003
CORRECTED TOTAL	125	102.023036	0.81618429

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	14.587831	2.91756619	3.76441	0.0038
DENOMINATOR	ERROR	110	85.254403	0.77504003		
NUMERATOR	PANEL	2	0.383988	0.19199379	0.24772	0.7842
DENOMINATOR	ERROR	110	85.254403	0.77504003		
NUMERATOR	YEAR*PANEL	8	1.796814	0.22460179	0.28979	0.9675
DENOMINATOR	ERROR	110	85.254403	0.77504003		

MEANS

PANEL	N	TEARFILL
1	45	6.91777778
2	58	6.63275862
3	23	6.42173913

YEAR		
7	4	8.82500000
8	12	6.12500000
9	8	7.81875000
10	24	5.93541667
11	50	6.54200000
12	28	7.24285714

LSD .01	LSD .05
0.652417719	0.493256629

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	5	55.570561	11.1141122
PANEL	2	4.175349	2.0876745
YEAR*PANEL	8	3.720731	0.4650913
ERROR	110	71.551375	0.6504670
RESIDUAL	110	71.551375	0.6504670
CORRECTED TOTAL	125	135.018016	1.0801441

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	5	55.570561	11.1141122	17.08636	0.0001
DENOMINATOR	ERROR	110	71.551375	0.6504670		
NUMERATOR	PANEL	2	4.175349	2.0876745	3.20950	0.0429
DENOMINATOR	ERROR	110	71.551375	0.6504670		
NUMERATOR	YEAR*PANEL	8	3.720731	0.4650913	0.71501	0.6795
DENOMINATOR	ERROR	110	71.551375	0.6504670		

APPENDIX K

TWO-FACTOR ANALYSIS OF VARIANCE

RANDOMIZED COMPLETE BLOCK DESIGN

MAIN PARACHUTES

MEANS

PANEL	N	BREAKWAR
1	27	43.7666667
2	51	44.1372549
3	50	44.5560000
4	47	44.8361702
5	40	44.7600000

YEAR		
6	5	42.1400000
7	40	46.0700000
8	10	44.1200000
9	30	46.8966667
10	45	44.9866667
11	70	43.1285714
12	15	40.8800000

LSD .01	LSD .05
2.40224457	1.82078552

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	638.68720	106.447866
PANEL	4	29.00079	7.250199
YEAR*PANEL	24	416.70073	17.362530
ERROR	180	2375.51900	13.197328
RESIDUAL	180	2375.51900	13.197328
CORRECTED TOTAL	214	3459.90772	16.167793

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	638.68720	106.447866	8.06587	0.0001
DENOMINATOR	ERROR	180	2375.51900	13.197328		
NUMERATOR	PANEL	4	29.00079	7.250199	0.54937	0.7030
DENOMINATOR	ERROR	180	2375.51900	13.197328		
NUMERATOR	YEAR*PANEL	24	416.70073	17.362530	1.31561	0.1589
DENOMINATOR	ERROR	180	2375.51900	13.197328		

MEANS

PANEL	N	BREAKFIL
1	27	44.2740741
2	51	43.8431373
3	50	44.3920000
4	47	43.6957447
5	40	44.0675000

YEAR	N	BREAKFIL
6	5	38.4000000
7	40	46.2175000
8	10	44.3300000
9	30	46.3500000
10	45	44.5844444
11	70	42.7271429
12	15	39.7133333

LSD .01	LSD .05
2.69904423	2.04574585

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	924.41668	154.069447
PANEL	4	15.24465	3.811163
YEAR*PANEL	24	209.30572	8.721072
ERROR	180	2998.77825	16.659879
RESIDUAL	180	2998.77825	16.659879
CORRECTED TOTAL	214	4147.74530	19.381987

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	924.41668	154.069447	9.24793	0.0001
DENOMINATOR	ERROR	180	2998.77825	16.659879		
NUMERATOR	PANEL	4	15.24465	3.811163	0.22876	0.9207
DENOMINATOR	ERROR	180	2998.77825	16.659879		
NUMERATOR	YEAR*PANEL	24	209.30572	8.721072	0.52348	0.9682
DENOMINATOR	ERROR	180	2998.77825	16.659879		

MEANS

PANEL	N	ELONGWAR
1	27	27.0037037
2	51	25.9960784
3	50	26.2840000
4	47	25.6744681
5	40	26.1250000

YEAR	N	ELONGWAR
6	5	21.6600000
7	40	28.4250000
8	10	24.3400000
9	30	26.2866667
10	45	27.0511111
11	70	25.0000000
12	15	25.0800000

LSD .01	LSD .05
3.13824272	2.37863731

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	487.42561	81.2376016
PANEL	4	32.42731	8.1068285
YEAR*PANEL	24	334.14695	13.9227895
ERROR	180	4054.12785	22.5229325
RESIDUAL	180	4054.12785	22.5229325
CORRECTED TOTAL	214	4908.12772	22.9351763

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	487.42561	81.2376016	3.60688	0.0024
DENOMINATOR	ERROR	180	4054.12785	22.5229325		
NUMERATOR	PANEL	4	32.42731	8.1068285	0.35994	0.8380
DENOMINATOR	ERROR	180	4054.12785	22.5229325		
NUMERATOR	YEAR*PANEL	24	334.14695	13.9227895	0.61816	0.9175
DENOMINATOR	ERROR	180	4054.12785	22.5229325		

MEANS

PANEL	N	ELONGFIL
1	27	25.3444444
2	51	26.4196078
3	50	27.1380000
4	47	27.3765957
5	40	26.3350000

YEAR	N	ELONGFIL
6	5	28.8800000
7	40	25.[illegible]825000
8	10	27.2800000
9	30	27.7033333
10	45	27.1288889
11	70	26.4028571
12	15	26.9400000

LSD .01	LSD .05
2.75351906	2.08703518

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	164.11308	27.3521804
PANEL	4	89.41226	22.3530645
YEAR*PANEL	24	351.27526	14.6364691
ERROR	180	3121.05177	17.3391765
RESIDUAL	180	3121.05177	17.3391765
CORRECTED TOTAL	214	3725.85237	17.4105251

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	164.11308	27.3521804	1.57748	0.1553
DENOMINATOR	ERROR	180	3121.05177	17.3391765		
NUMERATOR	PANEL	4	89.41226	22.3530645	1.28917	0.2751
DENOMINATOR	ERROR	180	3121.05177	17.3391765		
NUMERATOR	YEAR*PANEL	24	351.27526	14.6364691	0.84413	0.6775
DENOMINATOR	ERROR	180	3121.05177	17.3391765		

MEANS

PANEL	N	TEARWARP
1	27	7.98518519
2	51	7.19215686
3	50	7.28800000
4	47	7.27234043
5	40	7.64250000

YEAR		
6	5	6.58000000
7	40	7.94250000
8	10	7.10000000
9	30	7.77333333
10	45	7.02222222
11	70	7.34285714
12	15	7.30000000

LSD .01	LSD .05
0.904461801	0.685538530

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	26.965726	4.49428764
PANEL	4	15.143819	3.78595487
YEAR*PANEL	24	26.722196	1.11342484
ERROR	180	336.747608	1.87082004
RESIDUAL	180	336.747608	1.87082004
CORRECTED TOTAL	214	405.579349	1.89523060

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	26.965726	4.49428764	2.40231	0.0291
DENOMINATOR	ERROR	180	336.747608	1.87082004		
NUMERATOR	PANEL	4	15.143819	3.78595487	2.02369	0.0919
DENOMINATOR	ERROR	180	336.747608	1.87082004		
NUMERATOR	YEAR*PANEL	24	26.722196	1.11342484	0.59515	0.9328
DENOMINATOR	ERROR	180	336.747608	1.87082004		

MEANS

PANEL	N	TEARFILL
1	27	7.71111111
2	51	7.43725490
3	50	7.21000000
4	47	7.45744681
5	40	7.83000000
YEAR		
6	5	6.96000000
7	40	8.14250000
8	10	6.75000000
9	30	7.83000000
10	45	7.23111111
11	70	7.41142857
12	15	6.97333333

LSD .01	LSD .05
0.778701127	0.590217948

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	34.822638	5.80377306
PANEL	4	10.047247	2.51181182
YEAR*PANEL	24	19.875087	0.82812862
ERROR	180	249.612051	1.38673362
RESIDUAL	180	249.612051	1.38673362
CORRECTED TOTAL	214	314.357023	1.46895805

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	34.822638	5.80377306	4.18521	0.0008
DENOMINATOR	ERROR	180	249.612051	1.38673362		
NUMERATOR	PANEL	4	10.047247	2.51181182	1.81132	0.1274
DENOMINATOR	ERROR	180	249.612051	1.38673362		
NUMERATOR	YEAR*PANEL	24	19.875087	0.82812862	0.59718	0.9315
DENOMINATOR	ERROR	180	249.612051	1.38673362		

APPENDIX L

THREE-FACTOR ANALYSIS OF VARIANCE

RANDOMIZED COMPLETE BLOCK DESIGN

MAIN PARACHUTES

MEANS

PANEL	N	BREAKWAR
1	27	43.7666667
2	51	44.1372549
3	50	44.5560000
4	47	44.8361702
5	40	44.7600000
JUMP		
1	40	43.9150000
2	20	43.1550000
3	15	46.4733333
4	10	42.3300000
5	15	43.7000000
6	20	46.2600000
7	10	40.6700000
8	15	48.1000000
9	35	45.7114286
10	35	43.1228571
YEAR		
6	5	42.1400000
7	40	46.0700000
8	10	44.1200000
9	30	46.8966667
10	45	44.9866667
11	70	43.1285714
12	15	40.8800000

LSD .01	LSD .05
2.17418289	1.64139175

ANALYSIS OF VARIANCE FOR VARIABLE BREAKWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	638.68720	106.447866
JUMP	9	685.35074	76.150083
YEAR*JUMP	13	189.38778	14.568291
PANEL	4	29.00079	7.250199
YEAR*PANEL	24	416.70073	17.362530
JUMP*PANEL	35	363.40048	10.382871
YEAR*JUMP*PANEL	33	185.15027	5.610614
ERROR	90	952.22972	10.580330
RESIDUAL	90	952.22972	10.580330
CORRECTED TOTAL	214	3459.90772	16.167793

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	638.68720	106.447866	10.06092	0.0001
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	JUMP	9	685.35074	76.150083	7.19733	0.0001
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	YEAR*JUMP	13	189.38778	14.568291	1.37692	0.1859
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	PANEL	4	29.00079	7.250199	0.68525	0.6069
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	YEAR*PANEL	24	416.70073	17.362530	1.64102	0.0493
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	JUMP*PANEL	35	363.40048	10.382871	0.98134	0.5100
DENOMINATOR	ERROR	90	952.22972	10.580330		
NUMERATOR	YEAR*JUMP*PANEL	33	185.15027	5.610614	0.53029	0.9792
DENOMINATOR	ERROR	90	952.22972	10.580330		

MEANS

PANEL	N	BREAKFIL
1	27	44.2740741
2	51	43.8431373
3	50	44.3920000
4	47	43.6957447
5	40	44.0675000
JUMP		
1	40	44.0200000
2	20	42.6550000
3	15	46.3066667
4	10	40.5600000
5	15	43.4400000
6	20	47.0600000
7	10	39.5400000
8	15	48.6733333
9	35	44.1971429
10	35	42.5171429
YEAR		
6	5	38.4000000
7	40	46.2175000
8	10	44.3300000
9	30	46.3500000
10	45	44.5844444
11	70	42.7271429
12	15	39.7133333

LSD .01	LSD .05
2.84284592	2.14619637

ANALYSIS OF VARIANCE FOR VARIABLE BREAKFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	924.41668	154.069447
JUMP	9	1030.90171	114.544634
YEAR*JUMP	13	-230.68008	-17.744622
PANEL	4	15.24465	3.811163
YEAR*PANEL	24	209.30572	8.721072
JUMP*PANEL	35	340.62517	9.732148
YEAR*JUMP*PANEL	33	229.92228	6.967342
ERROR	90	1628.00917	18.088991
RESIDUAL	90	1628.00917	18.088991
CORRECTED TOTAL	214	4147.74530	19.381987

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	924.41668	154.069447	8.51730	0.0001
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	JUMP	9	1030.90171	114.544634	6.33228	0.0001
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	YEAR*JUMP	13	-230.68008	-17.744622	0.98096	1.0000
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	PANEL	4	15.24465	3.811163	0.21069	0.9302
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	YEAR*PANEL	24	209.30572	8.721072	0.48212	0.9779
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	JUMP*PANEL	35	340.62517	9.732148	0.53801	0.9795
DENOMINATOR	ERROR	90	1628.00917	18.088991		
NUMERATOR	YEAR*JUMP*PANEL	33	229.92228	6.967342	0.38517	0.9983
DENOMINATOR	ERROR	90	1628.00917	18.088991		

MEANS

PANEL	N	ELONGWAR
1	27	27.0037037
2	51	25.9960784
3	50	26.2840000
4	47	25.6744681
5	40	26.1250000

JUMP	N	ELONGWAR
1	40	27.5400000
2	20	23.6800000
3	15	27.4200000
4	10	25.5300000
5	15	27.2533333
6	20	28.5300000
7	10	24.5200000
8	15	27.0200000
9	35	23.9800000
10	35	25.9942857

YEAR	N	ELONGWAR
6	5	21.6600000
7	40	28.4250000
8	10	24.3400000
9	30	26.2866667
10	45	27.0511111
11	70	25.0000000
12	15	25.0800000

LSD .01	LSD .05
3.15632153	2.38285351

ANALYSIS OF VARIANCE FOR VARIABLE ELONGWAR

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	487.42561	81.2376016
JUMP	9	562.46053	62.4956145
YEAR*JUMP	13	998.95325	76.8425575
PANEL	4	32.42731	8.1068285
YEAR*PANEL	24	334.14695	13.9227895
JUMP*PANEL	35	459.23534	13.1210099
YEAR*JUMP*PANEL	33	26.64184	0.8073284
ERROR	90	2006.83689	22.2981877
RESIDUAL	90	2006.83689	22.2981877
CORRECTED TOTAL	214	4908.12772	22.9351763

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	487.42561	81.2376016	3.64324	0.0031
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	JUMP	9	562.46053	62.4956145	2.80272	0.0062
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	YEAR*JUMP	13	998.95325	76.8425575	3.44613	0.0004
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	PANEL	4	32.42731	8.1068285	0.36356	0.8351
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	YEAR*PANEL	24	334.14695	13.9227895	0.62439	0.9054
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	JUMP*PANEL	35	459.23534	13.1210099	0.58843	0.9606
DENOMINATOR	ERROR	90	2006.83689	22.2981877		
NUMERATOR	YEAR*JUMP*PANEL	33	26.64184	0.8073284	0.03621	1.0000
DENOMINATOR	ERROR	90	2006.83689	22.2981877		

MEANS

PANEL	N	ELONGFIL
1	27	25.3444444
2	51	26.4196078
3	50	27.1380000
4	47	27.3765957
5	40	26.3350000
JUMP		
1	40	27.1000000
2	20	26.5200000
3	15	26.3333333
4	10	25.3700000
5	15	25.8066667
6	20	25.0650000
7	10	29.0600000
8	15	26.6133333
9	35	28.5400000
10	35	25.3857143
YEAR		
6	5	28.8800000
7	40	25.1825000
8	10	27.2800000
9	30	27.7033333
10	45	27.1288889
11	70	26.4028571
12	15	26.9400000

LSD .01	LSD .05
2.70593262	2.04283428

ANALYSIS OF VARIANCE FOR VARIABLE ELONGFIL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	164.11308	27.3521804
JUMP	9	326.30301	36.2558906
YEAR*JUMP	13	587.00194	45.1539955
PANEL	4	89.41226	22.3530645
YEAR*PANEL	24	351.27526	14.6364691
JUMP*PANEL	35	527.69335	15.0769529
YEAR*JUMP*PANEL	33	205.08041	6.2145578
ERROR	90	1474.97306	16.3885895
RESIDUAL	90	1474.97306	16.3885895
CORRECTED TOTAL	214	3725.85237	17.4105251

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	164.11308	27.3521804	1.66898	0.1371
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	JUMP	9	326.30301	36.2558906	2.21226	0.0279
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	YEAR*JUMP	13	587.00194	45.1539955	2.75521	0.0027
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	PANEL	4	89.41226	22.3530645	1.36394	0.2518
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	YEAR*PANEL	24	351.27526	14.6364691	0.89309	0.6103
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	JUMP*PANEL	35	527.69335	15.0769529	0.91997	0.5994
DENOMINATOR	ERROR	90	1474.97306	16.3885895		
NUMERATOR	YEAR*JUMP*PANEL	33	205.08041	6.2145578	0.37920	0.9985
DENOMINATOR	ERROR	90	1474.97306	16.3885895		

MEANS

PANEL	N	TEARWARP
1	27	7.98518519
2	51	7.19215686
3	50	7.28800000
4	47	7.27234043
5	40	7.64250000

JUMP	N	TEARWARP
1	40	8.06000000
2	20	7.60500000
3	15	7.84666667
4	10	8.52000000
5	15	7.61333333
6	20	6.84500000
7	10	5.83000000
8	15	7.76666667
9	35	6.98000000
10	35	7.04857143

YEAR	N	TEARWARP
6	5	6.58000000
7	40	7.94250000
8	10	7.10000000
9	30	7.77333333
10	45	7.02222222
11	70	7.34285714
12	15	7.30000000

LSD .01	LSD .05
0.659732282	0.498062551

ANALYSIS OF VARIANCE FOR VARIABLE TEARFILL

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	34.822638	5.80377306
JUMP	9	43.493321	4.83259121
YEAR*JUMP	13	55.034731	4.23344082
PANEL	4	10.047247	2.51181182
YEAR*PANEL	24	19.875087	0.82812862
JUMP*PANEL	35	39.203602	1.12010291
YEAR*JUMP*PANEL	33	24.203508	0.73343965
ERROR	90	87.676889	0.97418765
RESIDUAL	90	87.676889	0.97418765
CORRECTED TOTAL	214	314.357023	1.46895805

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	34.822638	5.80377306	5.95755	0.0001
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	JUMP	9	43.493321	4.83259121	4.96064	0.0001
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	YEAR*JUMP	13	55.034731	4.23344082	4.34561	0.0001
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	PANEL	4	10.047247	2.51181182	2.57837	0.0420
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	YEAR*PANEL	24	19.875087	0.82812862	0.85007	0.6657
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	JUMP*PANEL	35	39.203602	1.12010291	1.14978	0.2944
DENOMINATOR	ERROR	90	87.676889	0.97418765		
NUMERATOR	YEAR*JUMP*PANEL	33	24.203508	0.73343965	0.75287	0.8199
DENOMINATOR	ERROR	90	87.676889	0.97418765		

MEANS

PANEL	N	TEARFILL
1	27	7.71111111
2	51	7.43725490
3	50	7.21000000
4	47	7.45744681
5	40	7.83000000
JUMP		
1	40	8.04250000
2	20	7.50000000
3	15	7.76666667
4	10	7.88000000
5	15	7.77333333
6	20	7.32000000
7	10	6.13000000
8	15	7.80000000
9	35	7.28857143
10	35	7.09428571
YEAR		
6	5	6.96000000
7	40	8.14250000
8	10	6.75000000
9	30	7.83000000
10	45	7.23111111
11	70	7.41142857
12	15	6.97333333

LSD .01	LSD .05
0.824338555	0.622331500

ANALYSIS OF VARIANCE FOR VARIABLE TEARWARP

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
YEAR	6	26.965726	4.49428764
JUMP	9	77.755920	8.63954670
YEAR*JUMP	13	69.443703	5.34182329
PANEL	4	15.143819	3.78595487
YEAR*PANEL	24	26.722196	1.11342484
JUMP*PANEL	35	41.350732	1.18144949
YEAR*JUMP*PANEL	33	11.310697	0.34274839
ERROR	90	136.886556	1.52096173
RESIDUAL	90	136.886556	1.52096173
CORRECTED TOTAL	214	405.579349	1.89523060

TESTS	SOURCE	DF	SUM OF SQUARES	MEAN SQUARE	F VALUE	PROB F
NUMERATOR	YEAR	6	26.965726	4.49428764	2.95490	0.0112
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	JUMP	9	77.755920	8.63954670	5.68032	0.0001
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	YEAR*JUMP	13	69.443703	5.34182329	3.51214	0.0003
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	PANEL	4	15.143819	3.78595487	2.48918	0.0480
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	YEAR*PANEL	24	26.722196	1.11342484	0.73205	0.8061
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	JUMP*PANEL	35	41.350732	1.18144949	0.77678	0.7980
DENOMINATOR	ERROR	90	136.886556	1.52096173		
NUMERATOR	YEAR*JUMP*PANEL	33	11.310697	0.34274839	0.22535	1.0000
DENOMINATOR	ERROR	90	136.886556	1.52096173		

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